May 1987

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THE COLOR COMPUTER MONTHLY MAGAZINE

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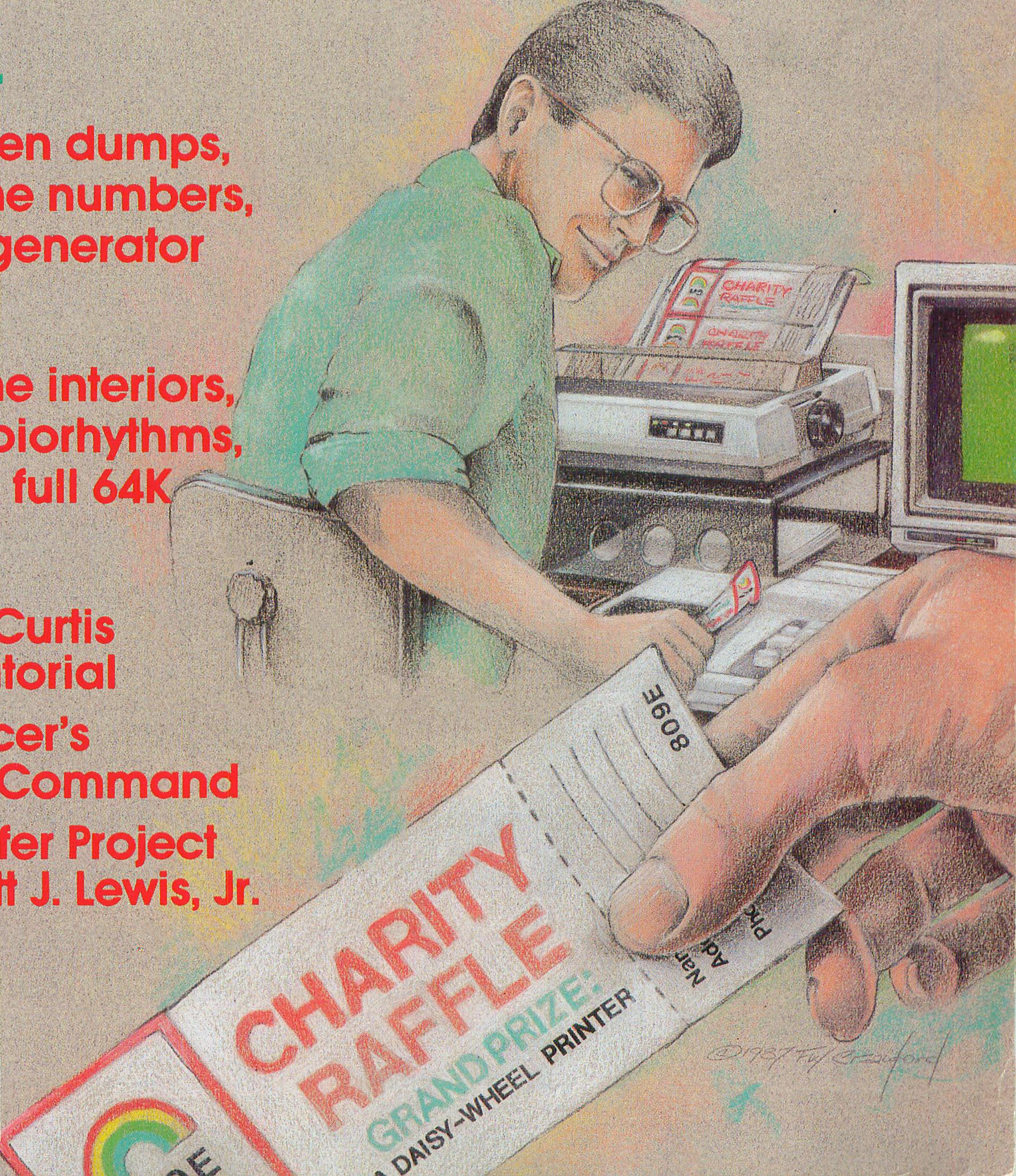
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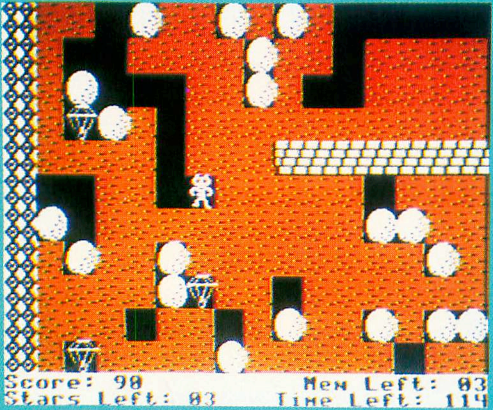

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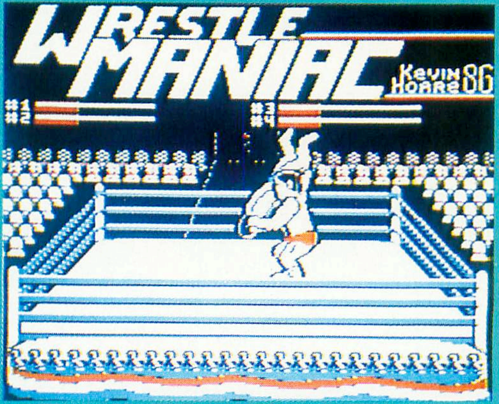

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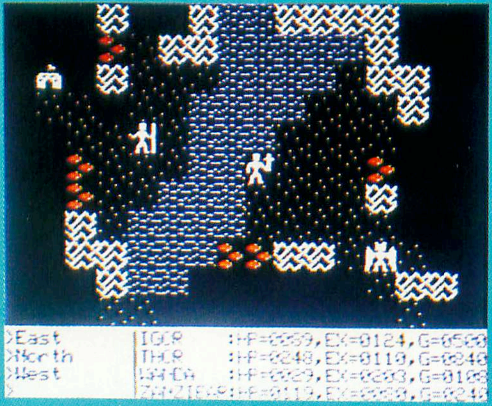

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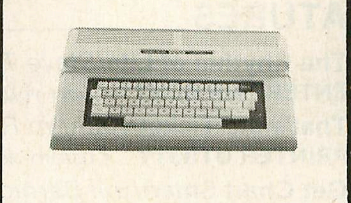

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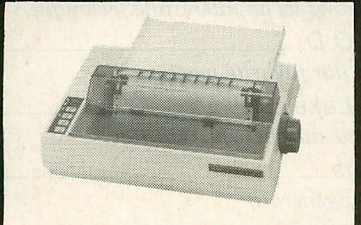

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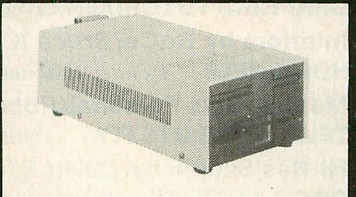

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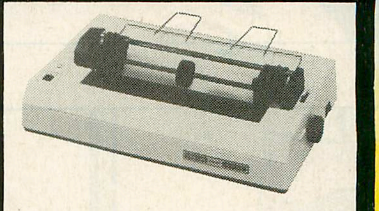

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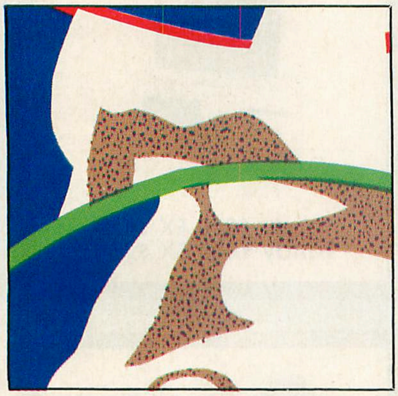
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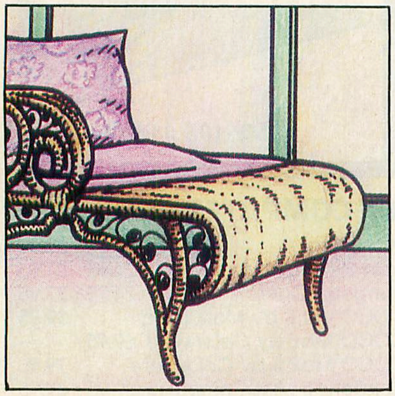
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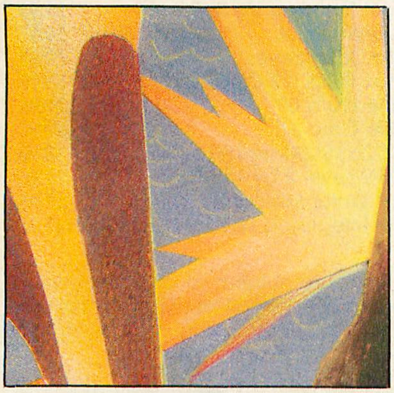
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NEXT MONTH: The first warm days of summer put a song in your heart, and our Music Issue will add to the chorus. CoCo is a tuneful fellow and needs only the slightest prompting to take center stage with its lilting melodies. So, no matter what your musical bent, our helpful articles, programs, utilities, reviews and columns will have you dancing in the streets.

Be sure to waltz on over to THE RAINBOW, the premier information source for the Color Computer 1, 2 and 3!

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May 1987 Vol. VI No. 10

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LETTERS TO THE RAINBOW

The Best Toy of All

Editor:

I have owned my CoCo for about four years, and can truly say I love the little monster. I originally bought it for creating title graphics to be recorded on video tape (I was beginning in the video business at the time). In four years time, that "toy" is now practically running my business for me! It is my typewriter, filing system, calendar, accountant, financial advisor and more. Has my CoCo paid for itself yet? Are you kidding?

I finally figured out what the CoCo *really* is. It's the toy I always wanted for Christmas — the toy I never get bored with because it's always evolving into something more than it was yesterday. This is largely due to RAINBOW. Many thanks.

T.J. Wolf
Venice, CA

Modification for Solitaire

Editor:

My letter appearing in the March issue had a modification to the Solitaire game from the December '86 issue. Due to a misprint, the clubs turn out distorted. The modification to Line 1230 is incorrect. `S$(2)` should read:

```
R3HUEFU3GHEL3FGHD3EFD2U4RDL
```

A '3' was printed in place of the G. Also, Line 141 should be `POKE 178, 1`, instead of `178, 2`, to get red paint.

Bill Bernico
Sheboygan, WI

On the Move

Editor:

Anyone who is trying to get in touch with me (after reading "Readable Equivalents to C" in the November 1986 issue) needs to know that my address and phone number have changed. The new address is: 1641 Routt Street, Lakewood, CO 80215, (303) 233-5390.

If you are looking for information on OSK (OS-9 for the 68000) feel free to write, as we have been using a 68020 OSK system for 10 months.

Calvin Dodge
Lakewood, CO

Adventures Unlimited

Editor:

Unbelievable! That's the only way to describe the terrific response I've received concerning *The Adventure Processor* [August 1986, Page 27].

In my article I included a sample method of implementing the verb `GET` into your Adventure "shell." Most readers have commented that I did not go far enough in showing how different verbs could be implemented. Rather than write another article showing how to implement various different verbs, I decided to write an Adventure game, sprinkle it generously with remark statements and make it available. I call it *DoomsDay*.

Bill Cook
4346 Rhododendron Drive
Oak Harbor, WA 98277

The Red Tape Express

Editor:

Enclosed is the wrapper from my February RAINBOW. If you think it looks bad, you should see the magazine!

At first, I completed a customer complaint card on each magazine. My post office would then send to the publisher for another copy for me. But it continued, in spite of their continual replies extending "regrets" and promises to do better. I continued completing the complaint cards, but they got tired of me and told me to start sending for my own replacement copies. I did. But I also saved all the response (regrets) cards and when I had a couple pounds of them, I sent them off to USPS in Washington, marked to the attention of the Postmaster General.

Pretty soon I received a letter from some bureaucrat expressing "regrets." If headquarters can't (won't) do anything about handling properly-packaged mail in the proper way, how can I expect the local mail people to care?

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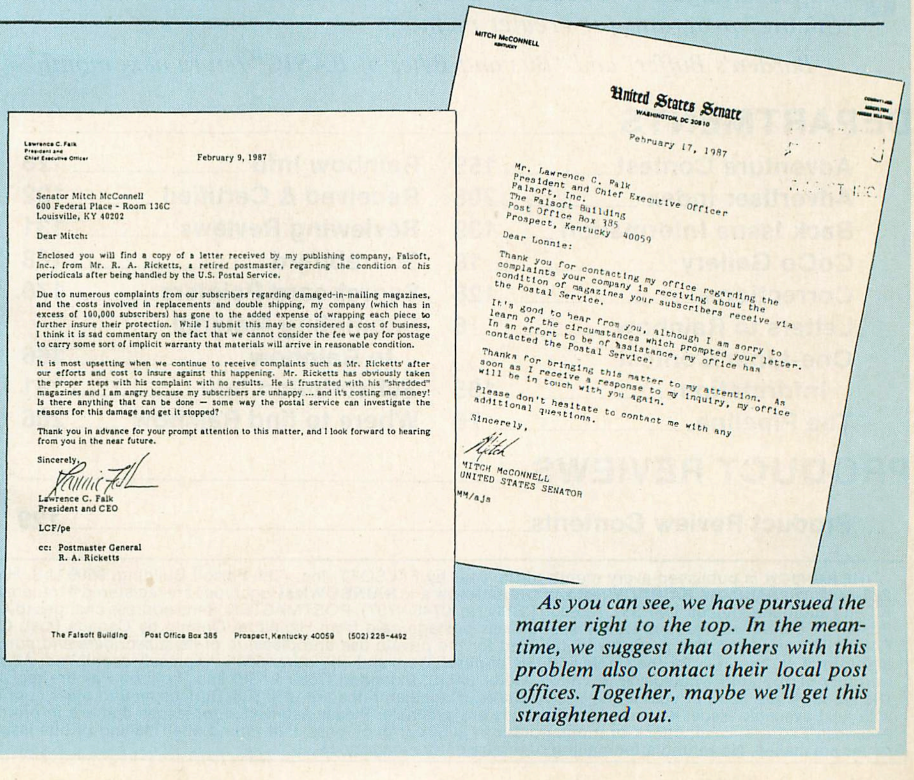
Bob Ricketts
Terrebonne, OR



Lawrence C. Falk
President and
Chief Executive Officer

February 9, 1987

Senator Mitch McConnell
600 Federal Place - Room 136C
Louisville, KY 40202

Dear Mitch:

Enclosed you will find a copy of a letter received by my publishing company, Falsoft, Inc., from Mr. R. A. Ricketts, a retired postmaster, regarding the condition of his periodicals after being handled by the U.S. Postal Service.

Due to numerous complaints from our subscribers regarding damaged-in-mailing magazines, and the costs involved in replacements and double shipping, my company (which has in excess of 100,000 subscribers) has gone to the added expense of wrapping each piece to further insure their protection. While I submit this may be considered a cost of business, I think it is sad commentary on the fact that we cannot consider the fee we pay for postage to carry some sort of implicit warranty that materials will arrive in reasonable condition.

It is most upsetting when we continue to receive complaints such as Mr. Ricketts' after our efforts and cost to insure against this happening. Mr. Ricketts has obviously taken the proper steps with his complaint with no results. He is frustrated with his "shredded" magazines and I am angry because my subscribers are unhappy ... and it's costing me money! Is there anything that can be done — some way the postal service can investigate the reasons for this damage and get it stopped?

Thank you in advance for your prompt attention to this matter, and I look forward to hearing from you in the near future.

Sincerely,

Lawrence C. Falk
President and CEO

LCF/pe

cc: Postmaster General
R. A. Ricketts

The Falsoft Building Post Office Box 385 Prospect, Kentucky 40059 (502) 228-4492

MITCH McCONNELL
KENTUCKY

United States Senate
WASHINGTON, DC 20510

February 17, 1987

Mr. Lawrence C. Falk
President and Chief Executive Officer
Falsoft, Inc.
The Falsoft Building
Post Office Box 385
Prospect, Kentucky 40059

Dear Lonnie:

Thank you for contacting my office regarding the complaints your company is receiving about the condition of magazines your subscribers receive via the Postal Service.

It's good to hear from you, although I am sorry to learn of the circumstances which prompted your letter. In an effort to be of assistance, my office has contacted the Postal Service.

Thanks for bringing this matter to my attention. As soon as I receive a response to my inquiry, my office will be in touch with you again.

Please don't hesitate to contact me with any additional questions.

Sincerely,

Mitch

MITCH McCONNELL
UNITED STATES SENATOR

MM/ajs

As you can see, we have pursued the matter right to the top. In the meantime, we suggest that others with this problem also contact their local post offices. Together, maybe we'll get this straightened out.

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That Funky Feline

Editor:

My favorite part of the magazine: CoCo Cat. It's my favorite because it makes me chuckle and forget how boring typing umpteen-dozen data lines can be.

Walter Medak
Edmonton, Canada

If you like CoCo Cat, you'll definitely like the article by H. Allen Curtis on Page 52 of this issue.

Go to the Head of the Class

Editor:

RAINBOW is good, but much of it is far over the heads of us "freshmen" — a little like being dumped into the mid-year of a calculus class. How about a section for us beginners? One suspects that there will always be a new "class" of beginners. Those of you who are old hands must remember that this is a foreign language to us and we must start at the beginning.

L.K. Stamp
Salem, SC

BACK TALK

Editor:

Regarding the `CO3COLOR` program in the March 1987 "Bits and Bytes of BASIC" in Line 40, the first `HBUFF2,98` should be `HBUFF2,908`. If you are seeing three green dots next to the numbers, just make this change.

Paul E. Morin
Woonsocket, RI

Correction: No Correction Needed

Editor:

Concerning Marty Goodman's comment [November 1986] on J & R's BANKER memory expansions, Marty misleadingly states that a hardware correction is required for our BANKER memory expansion for CoCo 1 and 2 to be compatible with certain software. There is no correction required!

We have always provided both hardware (64K switch) and software `CLRFIX.BAS` solutions to compatibility problems. We support our product and are available to help users with their problems. When the 64K switch is *on*, the BANKER is absolutely 100 percent compatible with any CoCo 1 or CoCo 2 software; we guarantee that!

The partial fix Marty mentions involves connecting the 6809's LIC signal (Pin 38) to an unused input of the BANKER's address decoder (74LS133). This prevents a CLR opcode from reading the BANKER latch before writing zeros to the data bus. The *CLRFIX* program included in our BANKER software performs the same fix, with no soldering required.

The above fix does not prevent an instruction such as LDA $FFC0 or LDA 0,X from reprogramming the latch, as some memory sense routines do. The solution here is to toggle the 64K switch on when loading such programs or to use our software and support to fix the offending program.

By the way, our CoCo 3 512K JramR upgrade is absolutely compatible with Radio Shack's 512K upgrade and runs all CoCo 3 software.

In summary, we do not recommend the fix that Marty speaks about. A hardware "correction" is neither required nor needed. From day one of J & R, we have provided *complete* memory systems, backed by our *support*. Ours was the first complete (hardware and software) 256K and 512K upgrade for CoCo 1 and CoCo 2, and we were first again with a complete CoCo 3 512K upgrade. You'll never get a memory expansion from us without software to run on it and documentation to get the maximum benefit from it!

Jesse W. Jackson
J & R Electronics

COCO 3

Editor:

If you are trying to run your printer through a Metric Industries interface and your CoCo 3 doesn't recognize the pokes for 4800 or 9600 baud, the problem is with the CoCo 3, not the interface. We were advised by Radio Shack's hardware support group in Fort Worth that the CoCo 3 was not designed to go faster than 2400 baud. However, they could not explain why our, and other, CoCo 3s run at these higher speeds. It seems that some will and some won't. Don't feel that CoCo 3 is inferior because of this. Most printers in use by the CoCo community *cannot print* faster than 2400 baud, due to *the printer's* mechanical limitations. In most cases you will see no difference in printer speed between 2400 and 9600 baud.

Don Horn
President, Metric Industries

For the Price of a 'Box'

Editor:

I am a CoCo 1 user. I saw the articles in your September 1986 issue about the CoCo 3 and I was greatly impressed. Then I saw your paragraph which says: "Fully compatible with all the hardware you own now. Just unplug your disk drive, tape recorder, printer and so on, replace your present 'Box' with a CoCo 3, and plug everything in again. It all works."

I was so amazed that I called my local Radio Shack expecting to turn in my "Box." But they said they do not take "trade-ins." So could you please tell me what to do.

Bernard Robichaud
Moose Jaw, Saskatchewan

We did not mean to imply that you can trade in your present computer. We simply meant that the CoCo 3 is nearly 100% compatible with your old hardware.

HINTS AND TIPS

Editor:

For those of you who are bothered by the fact that the CoCo 3 can only do 192 vertical lines, here is a fix:

```
10 POKE&HE7BA,199:POKE&HE7BE,
   198´ IF Y>199 THEN Y=198
15 POKE&HF521, 199:POKE&HF526,
   198´HDRAW IF Y>199 THEN Y=198
20 POKE&HEB75,198´FIX FOR PAINT
30 FORA=&HE06C TO &HE06F:POKEA,
   PEEK (A) OR 32´CHANGE TO X-VALUE
   BY 200
40 POKE&HEFDF,24´FIX HPRINT
   COMMAND TO WORK WITH 25 ROWS
```

Don't run this before any program that uses a lot of `HPAINTs`; it is likely to cause spillover.

Alan T. Dekok
Kanata, Ontario

Speech/Sound Help

Editor:

I recently purchased the Color Computer Speech/Sound Cartridge. I've discovered a programming error used in the example programs from the manual. It occurs on lines used to check the status bits at address &HFF7E. On Page 6, the variable `Y` is set to equal &HFF7E.

```
140 IF PEEK(Y) AND 128=0 THEN 140
```

The basic interpreter always sees this as a true statement. No ANDing is performed between location Y and the value of 128. To force ANDing to take place, parentheses are needed.

```
140 IF (PEEK(Y) AND 128)=0 THEN 140
```

To check Bit 6 to see if the S/SC is currently speaking use:

```
100 IF (PEEK(Y) AND 64)=0 GOTO 100
```

To check Bit 5 to see if the S/SC is currently executing a sound effect use:

```
100 IF (PEEK(Y) AND 32)=0 GOTO 100
```

Jack Shaffer
Champaign, IL

The Perfect Excuse

Editor:

Thank you, Mr. Scerbo, for consistently good programs. Many have been useful in my second grade classroom. Thank you for sharing your talents.

The combination of his February program and Radio Shack's sale on the Speech and Sound Cartridge finally provided an excuse to purchase the cartridge. The program works very well, but it sometimes did not speak when I started up my machine. Adding a line at the beginning of the program to reset the cartridge solved it for me. The line is:

```
0 POKE &HFF7D,1:POKE &HFF7D,0
```

Paul French
Burlington, IA

Getting Organized

Editor:

After I am done reading the latest issue of RAINBOW, I make a copy of any OS-9 articles in the magazine and keep them in a three-ringed binder for future reference. This way, if I need some additional information on an OS-9 subject, I only have to thumb through the notebook instead of going through all of my back issues of RAINBOW.

Paul Wicker
Willingboro, NJ

In Living Color

Editor:

People who are unhappy about having no color for CoCo 2 programs running on their CoCo 3 with a CM-8 monitor can now add color very easily. Before loading any program, type `PALETTEX,Y`. The `Y` can be any of the 63 colors available. When `X=10`, the `PMODE4` colors that usually show up black will now be whatever color `Y` was set to be. When `X=11`, the `PMODE4` colors that usually show up white will now be whatever color `Y` was set to be.

Also, in the 320-column mode of the CoCo 3, the foreground and background colors can be changed. Type `PALETTEX,Y`. Again, `Y` can be any of the 63 colors available. When `X=12`, the foreground (letters and numbers) will be whatever color `Y` was set to be. When `X=13`, the background will be whatever color `Y` was set to be. However, pressing the reset button will change all colors back to the usual start-up colors.

Marc Lederman
Carmel, NY

REQUEST HOTLINE

Editor:

I am interested in assembly language programming for floppy disk communication. I have had some success in writing ML programs for ACIAs, PIAs and interrupt-driven routines. However, talking to a disk with an ML program appears to require some "tricks" in reading the data correctly.

Barry Barnes
P.O. Box 317
Oswego, IL 60543

A Buffer Idea

Editor:

I am interested in a utility program that would allow routine programming and disk I/O while `CSAVE` or `CLOAD` is working. My idea is that something similar to a `PCOPY` could be done (with ML) to a buffer area similar to a print spool, and the spool area then activated. Is this possible with CoCo's interrupts working as they do?

Kerry B. Rogers
USS Orion (AS-18)
FPO New York, NY
Sardinia, Italy 49513-2570

High-Voltage Requests

Editor:

I need electrical engineering programs for my Color Computer — low and high pass, active and LC filters, coil design, delay lines, amplifiers simulation, transformers design (E and pot cores) and so on.

Andrew Soltyk
8 Town Garden Dr. Apt. 4
Liverpool, NY 13088

Needs to Read

Editor:

We have a 9-year-old son who has difficulties in reading and reading comprehension. We have been trying to find quality programs for the CoCo 2 in this area. We have only been able to find quality reading programs from Dorsett Educational Systems. The problem we have with their programs is that after doing the programs once, our son has all the correct answers memorized. Any help would be appreciated.

Linda A. Arver
2175-36 N. Main Street Exit
Butler, PA 16001

INFORMATION PLEASE

Editor:

I was wondering if there are any games for the CoCo that are similar to *King's Quest* for the Tandy 1000/1200. Thank you.

Mark Bourdeaux
3130 Earl Drive
Spring Arbor, MI 49283

Looking for a Bargain

Editor:

I am running a cassette-based CoCo 2 and want to upgrade to disk. I would like to know if anyone knows where I might be able to purchase a used Drive 0.

Shane Farris
Route 2 Box 178
Kings Mtn., NC 28086

Wants to Join In

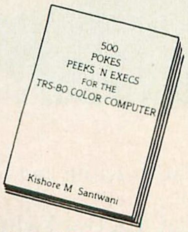
Editor:

Does anybody know if there is a BBS in the Columbus, Central Ohio area? If so, write to me.

David Carver
3725 Rome Corners Road
Galena, OH 43021

500 POKEs, PEEKs, 'N EXECs

FOR THE TRS-80 COCO



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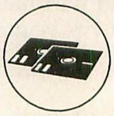

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The Little Train That CoCould

Editor:

I finally found a source for everything I've ever wanted to know about CoCos — RAINBOW.

I was in a software slump until I purchased a copy of your fine magazine at a local bookstore.

Does anyone have or know of a simulation program for railroad dispatching or train running? Can someone supply the codes to get the *Where is it?* program on Page 93 of the December 1986 issue of RAINBOW up and running with a DMP-105 printer?

Kurt Stecco
2309 S. Prairie Avenue
Pueblo, CO 81005

BULLETIN BOARD SYSTEMS

- The newly formed Southeast Connecticut Color Computer Users Group meets the third Monday of every month. For further information contact me at (203) 448-1388 or the Coconut Manor BBS at (203) 449-1792 (24 hours). Leave a message for SAILORBILL.

Bill Gross
Groton, CT

- I am proud to announce the opening of the Cocoa CocoNut BBS. It is run on a 64K Tandy CoCo 2, two drives, a DCM5 modem, and RS-BBS. The board is online from 9 p.m. to 5 a.m. EST, (305) 632-8956. All callers are instantly validated. The master logon password is RAINBOW. If you call out of hours, please call voice.

Michael Whipple
Cocoa, FL

- I would like to inform your readers of a new CoCo BBS. It is called The Time Machine. Protocol is 8 word length, no parity and 1 stop bit. The phone number is (813) 831-8111 and is up 24 hours a day. The board is run on 64K CoCo 2, Multi-Pak, and double-disk system. The software is original, based on the *Remote 232* driver that appeared in the November 1986 issue.

Bernie Middendorf
Tampa, FL

- The CoCoNuts of Illinois BBS can be accessed 24 hours a day at (618) 465-0808. There is about 5 meg of files and downloads. 300 or 1200 baud is available, and it uses Xmodem. It is run on a modified *Colorama* board. Hackers' Haven BBS is also online 24 hours, 300 or 1200 baud at (618) 251-4243 and is running on a *KKBBS* setup.

Al Muick
Wood River, IL

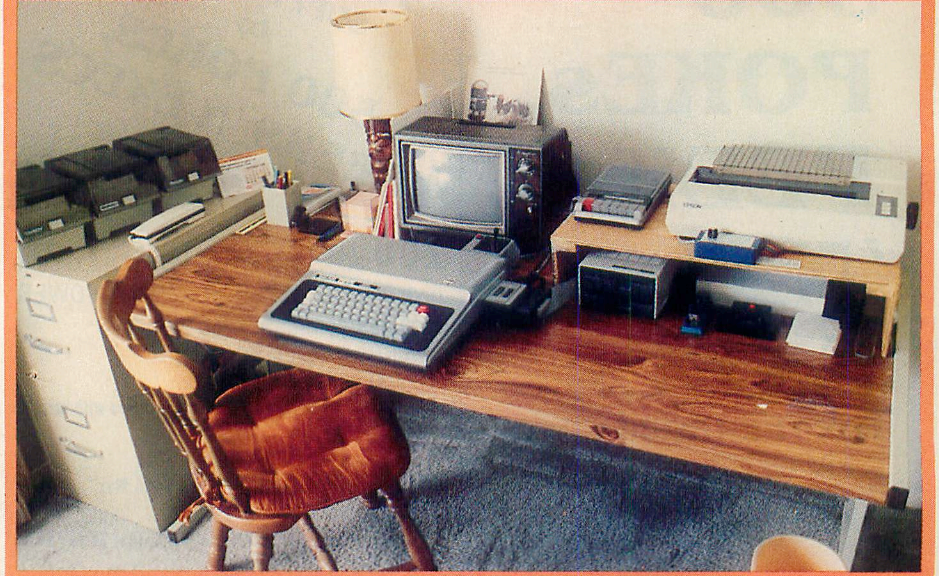
- I would like to announce the opening of a new BBS in Mansfield. It is run on, and fully dedicated to, the CoCo. It is currently running on a 64K with three disks and Richard Duncan's *CoBBS* Version 1.2. It is up 24 hours a day. Call (617) 339-1996, and goes by the name CoCoBBs.

Roy Jerman
Mansfield, MA

- The Siouxland Color Computer is changing. It will be for members only and there is a sign-up fee to get on the board. If you would like to join, send me your full name and address along with a phone number where we can call and verify the information. There is a $5 per year fee. The new board is run under the *CoBBS* System and should have a lot more to offer than before. Call (402) 494-2284.

Alan Pedersen
South Sioux City, NE

Show 'n' Tell



Editor:

I am always interested to see how others have their CoCos set up and maybe others would also like to see this.

Here is a picture of mine to start out. I have a 64K CoCo 1, two Radio Shack disk drives, cassette and an Epson FX-80 printer.

Norman G. Thode, Austin, TX

- I am pleased to announce the very first BBS for Canandaigua, NY. CoBBS #41A, sister to CoBBS #41 of Corning, AR. CoBBS #41A features Xmodem uploads and downloads, hobby section and more. Seven days a week from 8 a.m. to 8 p.m. EST, (501) 857-3138. Please use real names. 7-E-1.

Sam Fagg
Canandaigua, NY

- There's a new BBS that supports the CoCo 1, 2 and 3 in Altus, OK. Shamrock BBS is running on a 640K 32 meg, hard-drive PC Clone. It fully supports all CoCos with uploads, downloads and a full message base specifically for CoCo users. Call (405) 482-7080 24 hours, 300/1200 baud.

Craig Riley
Altus, OK

- I have recently started a BBS using the *Colorama* package. The BBS number is (717) 273-8444, 24 hours a day. There are downloads for CoCo 2 and 3. Use 8 bits, no parity, 300 baud only. There is another BBS in the reading area using a *Colorama* system: Glass Menagerie at (215) 376-1819. This BBS is also 24 hours a day, 300 baud. SysOps: Balloon Meister and Glass Man.

Ricky V. Elyar
Lebanon, PA

- The CoCo Beach BBS is going strong in Virginia Beach, VA. (804) 474-1211, 300/1200 baud, 7-E-1 or 8-N-1. Over 200 programs for downloading.

Jim McCracken
Virginia Beach, VA

- There is a new BBS in northern Ontario. This BBS is free to all. It features E-mail, gossip, gallery, up/downloading, want ads, hints, tips and much more. Call (705) 848-1221. Hours are Monday through Friday, 7 p.m. to 7 a.m., Friday at 7 p.m. till Sunday 9 p.m. Soon to be run 24 hours.

Mike Dickerson
Elliot Lake, Ontario

- I'd like to mention CoCo BBSs in Surrey, British Columbia. Call of the Wild, (604) 597-1964, 24 hours, Gerry Bell. Bit by Byte BBS, (604) 581-6310, 24 hours, Mark Loblaw. Delta 80 BBS, (604) 585-0680, 24 hours, Charles Lindberg.

Gerry Bell
Surrey, British Columbia

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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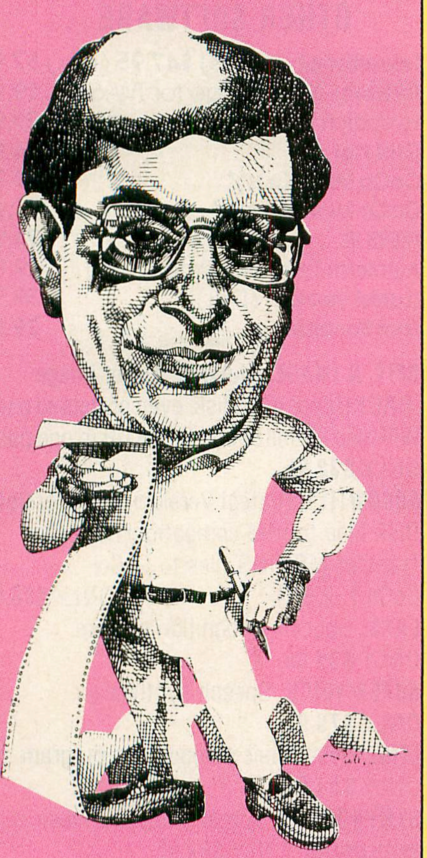


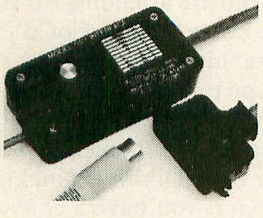
Of Contests and Books and Births

Our fourth Adventure contest is being announced in this month's magazine, so it's time to "get cracking" in order to meet the August 15 entry deadline! I happen to believe that Adventures not only are a lot of fun to play (they're addictive and account for untold hours of lost sleep as Adventurers press on into the wee hours), but they're also an excellent introduction to the art and craft of programming: Many folks get their first real look at the construction of a program by "sneaking a peek" at a BASIC listing for a hint to "get past the dragon's cave."

A nice thing about writing Adventures is that you do not have to be a computer expert; imagination and an Adventurous spirit are the keys. Some of the most entertaining and challenging Adventures have a very simple program structure, but they excite us with the twists and turns and unexpected aspects of the plot itself. Therefore, even if you're a beginning BASIC programmer, you can and should enter our Rainbow Adventure Contest, and I hope that you will. The rules and all are on Page 159 of this issue.

One way to get started is to obtain a copy of our brand new, just off the presses collection of contest-winning Adventures: *The Third Rainbow Book of Adventures* (see Page 65 for details). A virtual textbook on Adventuring, it contains 19 top-notch examples of what it takes to create an entertaining — and prize-winning — Adventure. And, when our fourth Adventure contest results are announced, you could well be among those who share the prizes our advertisers are donating and perhaps see your entry published, either right in RAINBOW itself, or in our fourth Adventure book. I'm very pleased with our newest addition to The Rainbow Bookshelf and want to publicly thank not only our contestants/authors, but also Jutta Kapfhammer and Philip Helm, who conscientiously judged the

Model 101 Interface $39.95



- Serial to parallel interface
- Works with any COCO
- Compatible with "Centronics" parallel input printers
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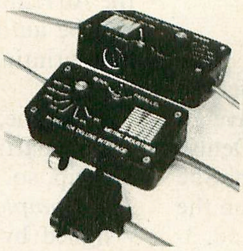
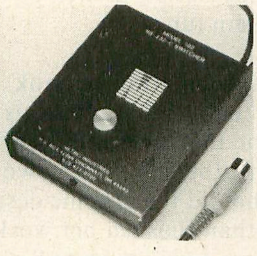
- Small size 4" x 2" x 1"
- Comes complete with cables to connect to your computer and printer

Model 104 Deluxe Interface $51.95



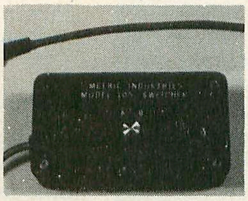
Same features as 101 plus
- Built in serial port for your modem or other serial device
- Switch between parallel output and serial output
- Size is 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

Model 102 Switcher $35.95



- Connect to your COCO serial port and have 3 switch selectable serial ports
- Color coded indicator lights show switch position
- Lights also serve as a *power on* indicator for your COCO
- Heavy guage blue anodized aluminum cabinet with non-slip rubber feet

Model 105 Switcher $14.95



- Connects to your COCO to give you 2 switch selectable serial ports
- 3 foot cable to connect to your COCO's serial port
- The perfect item to use to connect a printer and a modem to your COCO
- Small in size, only 4.5 x 2.5 x 1.25

Cassette Label Program $6.95

- New Version - tape transferrable to disk - save and load labels from tape to disk
- Prints 5 lines of information on pin-feed cassette labels
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- U.L. listed foil-shielded cable
- 2 Types: male/female extension cables (used between a serial device and existing cable) male/male cables (used between two serial devices such as a modem and one of our switchers).
- 3 ft./$3.95, 6 ft./$4.49, 10 ft./$5.59 Specify M/M or M/F and length.

The 101 and 104 require power to operate. Most printers can supply power to your interface. (Star, Radio Shack and Okidata are just a few that do - Epson and Seikosha do not). The interfaces can also be powered by an AC adaptor; Radio Shack model 273-1431 plugs into all models. If you require a power supply, add a "P" to the model number and add $5.00 to the price. (Model 101P $44.95, Model 104P $56.95).

The Model 101, 102, 104 and 105 work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Ioth, Seikosha, Panasonic and many others. They support BASIC print commands, word processors and graphic commands.

We manufacture these products - dealer inquiries are invited.

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Answers to Often Asked Questions About Our Products

I have a Radio Shack printer that has a serial input as well as a parallel input, why would I need a serial to parallel interface?
Most Radio Shack printers, that have a serial input, only permit the use of 600 or 1200 baud. With our model 101 or 104 connected to your computer and the parallel input of your printer, you may send data to the printer at up to 9600 baud. This means that your printer can operate at its maximum speed and print your documents many times faster than the serial input will permit.

What is baud rate and how do I change it?
Baud rate is the speed that data is transmitted. In our application it is the speed the COCO sends data to printers, modems, interfaces, or whatever is connected to the COCO's serial port. The baud rate of the COCO may be checked or changed by using a simple peek or poke. This is explained in the instructions that come with our interfaces

How can I find out if a certain printer will work with my COCO and one of your interfaces?
Look in your printer manual or check with the dealer to see if the printer has a "Centronics" type parallel input. If you are still not sure call us and we will try to answer your questions.

OK, I want an interface, but do I get the one with the power supply or without it?
Our interfaces require power in order to operate. Most printers have 5 volts available on their parallel input port. You can look in the manual that came with your printer for this information. Find a description of your printer's parallel input connector. On PIN 18 there should be +5 volts at a minimum of 25 MA. If your printer does not have the 5 volts on PIN 18 then you will have to power your interface with an AC adapter. If you cannot find this information give us a call. We have this information on many printers.

Should I buy a model 101 or 104?
If you are only connecting a printer to your system the model 101 will fit your needs. But if you plan to connect a modem or maybe another printer to your COCO, then the model 104 is for you. The model 104 has a serial output as well as a parallel output. There is a switch on the 104 that lets you send the COCO's output to either a parallel printer or a serial device such as a modem

Can I print data while I am on-line with my modem by using the 104?
No, the 104 will let you switch between the modem and printer. Even if the 104 would connect them both at the same time your COCO would not be able to communicate with both at the same time.

What does the model 102 switcher do?
The 102 is a serial switch. It connects the serial port of your COCO to up to three serial input devices. With the 102 installed in your system you can switch your COCO's serial port between interfaces, printers, modems, or even another COCO.

Why should I buy a switcher when I can just plug and unplug cables when I want to change from printer and modem?
Every time you plug or unplug you are wearing the contacts of the connectors. Connectors can and do fail from excessive use. Should you have to pay the price to have the serial connector on your COCO replaced, you will probably spend much more than the cost of a switcher.

What is the difference between the 102 switcher and the 105 switcher?
The 102 is in a metal cabinet, has lights to show switch position and has three outputs. The 105 is in a plastic cabinet, has no lights, has a pointer on the knob to show switch position, and has only two outputs. The 105 was designed for the person who has a serial printer or a parallel printer and an interface, who wants to add a modem or other serial device to their system. Simply speaking, the 105 will switch your COCO between two serial devices.

The 102 has lights, where does it get its power?
The 102 is powered by the serial port of the COCO. This has no effect on the computer.

Can I print mail labels with the "Cassette Label" program?
No, it only prints labels for cassette tapes. We will have other label printing programs in the near future.

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> *"The Rainbow Bookshelf is expanding and more are on the way"*

contest and expertly edited the book — a massive undertaking that has produced a valuable new resource for learning the basics, as well as a source for just plain fun.

They say creating a book is "like having a baby." To advise us on the validity of that assertion, we have to look no further than our own Denise Webb, who did the graphic design: She no more than finished her work on the book before giving birth to 8-pound, 3-ounce Dustin Michael Webb. Of course, there's a big difference: One project is over and done, while the other is a lifelong commitment!

Actually, we have two books being "birthed" this month. Our long-awaited and scholarly work, *The Rainbow Introductory Guide to Statistics*, is also ready, just in time for RAINBOWfest Chicago. In fact, RAINBOW Contributing Editor Michael Plog will be on hand at our fifth Chicago show to autograph copies. And, of course, Jutta will be at RAINBOWfest and might be persuaded, along with several of the winning authors who are attending, to sign the Adventure book. In fact, CoCo Cat will be autographing (or, should I say paw-printing) pictures, too.

This time, both Dale Puckett and his writing partner Peter Dibble are making the trip, so, even if you have a copy of *The Complete Rainbow Guide to OS-9* signed by Dale, you might want to bring it along for Peter to autograph, too. No, they won't have their latest book ready for the Chicago show, but we do expect to have printed copies of their comprehensive guide to the CoCo 3 and OS-9 Level II by mid-July! In the printing business, that's just around the corner.

Books and more books. Yes, The Rainbow Bookshelf is expanding and more are on the way; but, then, this is our printer issue, isn't it?

— Lonnie Falk

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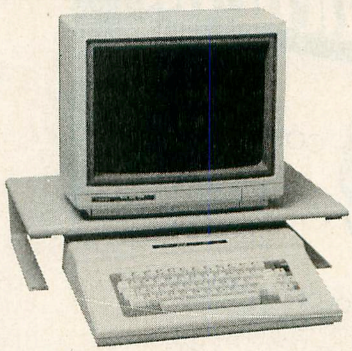

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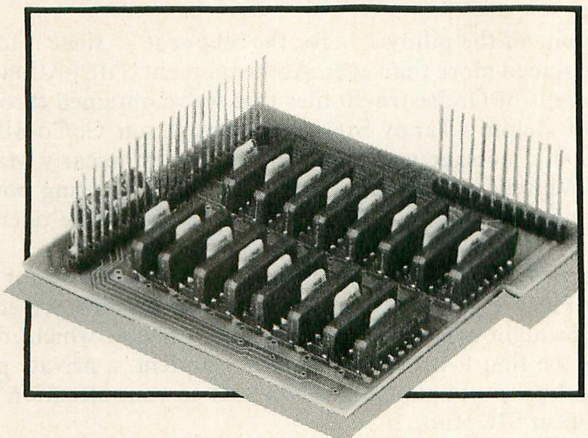

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BUILDING MAY'S RAINBOW

A bit of bike trouble . . .

. . . but we keep on pumping

Dorris, my wife, sometimes says to me, "Do you have to tell people everything?" but since she recently blurted, "I gotta get a picture of this!" I guess it's OK to discuss my latest "peripheral."

Besides, hooking a lap keyboard to the handlebars of my exercycle is a very logical idea that needs sharing; I wish I'd thought of it sooner. I mean, with as much time as I spend in front of a monitor, anything to improve the circulation is a benefit. It was at the "pillow stage" of my exercise in exercising that she wanted to preserve the moment with a picture.

You see, since I was uncertain about how to attach the keyboard to the bike, my first response was to pile several pillows on the handlebars to form a platform of sorts. It took five big feathery ones to achieve the proper height before plopping the keyboard in place. The monitor itself, I situated atop a nearby chest of drawers in which I keep documentation and odds and ends. The whole thing was a bit precariously jury-rigged, but it worked — sort of.

My glasses posed a problem. Since my close vision is fine, I have avoided getting bifocals by just removing my glasses for reading or close work, but pedaling away on the exercycle with my keyboard on the pile of pillows and the monitor some four feet away, I need my glasses to see the screen. On the other hand, they actually impair my close vision enough that I cannot see the keyboard properly with them on. Yes, I must hunt and peck as I huff and puff. Being a creative sort, I have eliminated the need for glasses by squinting and relying heavily on the 32-column text mode. Long term goal: Learn to touch type.

A notable breakthrough came when I remembered seeing a "reading stand" designed especially for exercycles. Sure enough, the local Schwinn dealer had a nice one and, my oh my, it's the perfect height and width for the keyboard — looks like a custom installation. It can also hold a CoCo itself, though the wiring gets even junkier looking than usual. Add a Multi-Pak Interface, you're getting big-time bizarre.

Actually, I may keep one of the pillows — for the bike seat — since it looks like I'll be in front of the screen more than ever. At the moment, THE RAINBOW's CoCo SIG is adding dozens of Orchestra-90 files that we've obtained through our recent acquisition of Delphi's Tandy SIG. And, though our CoCo SIG is in high gear — the 25,000th message was posted in the Forum in early March by John Kendziora of Whitehouse, Ohio — Falsoft is busily creating both a PC Compatibles SIG and an Aviation SIG on Delphi; both will be open by the time you see this.

The Aviation SIG is tied to our newest publication, NEW PILOT, for the Student and Low-Time Flier. NEW PILOT's premier issue carries an April cover date and is two-color throughout. We're proud of all 16 pages, which make it four times as large as the first RAINBOW! If you're a student, a private pilot or simply an aviation enthusiast, I commend NEW PILOT to your attention and invite you into our Aviation SIG, too.

From pedaling to peddling, here's my usual wheeling deal: Enter an annual subscription and we'll steer a RAINBOW your way (look Ma, no hands) each month throughout a one-year cycle.

— Jim Reed

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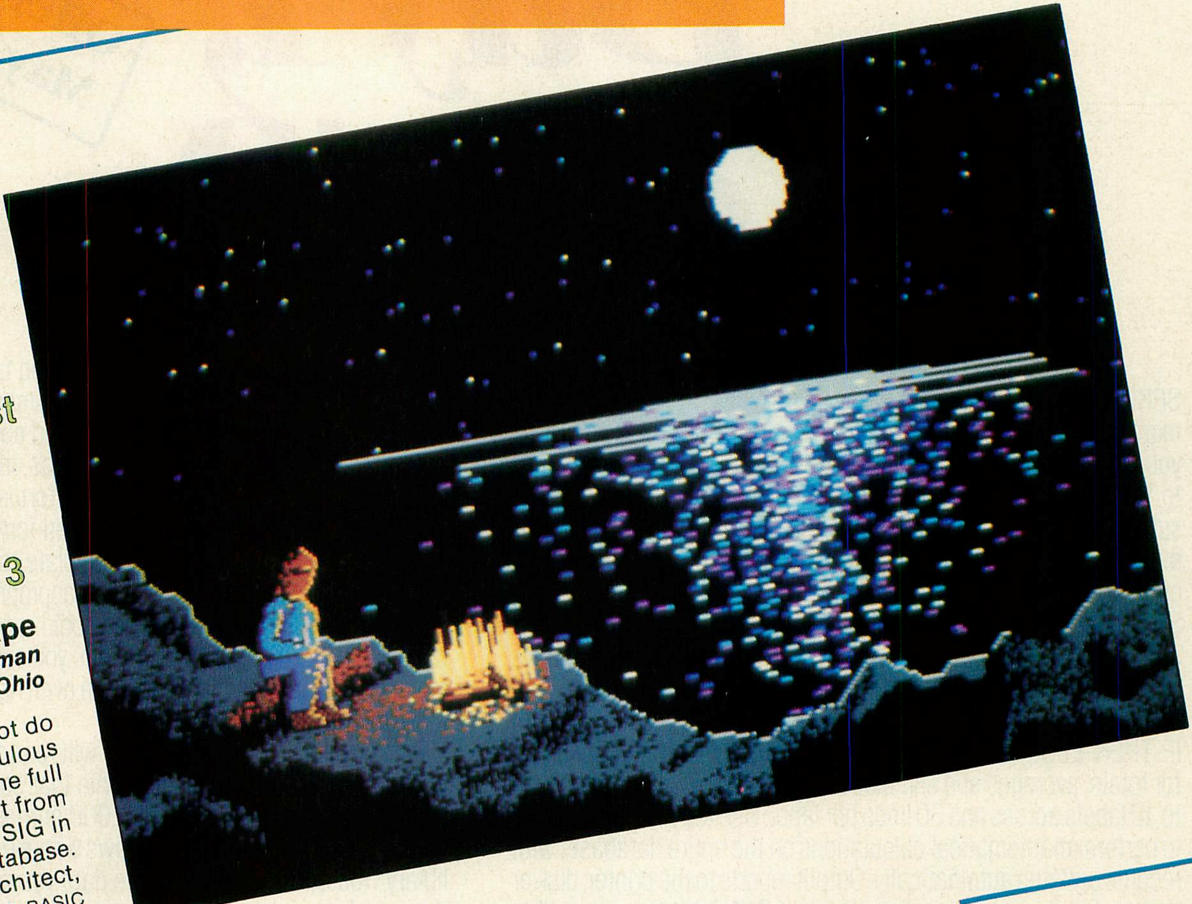
The CoCo Gallery

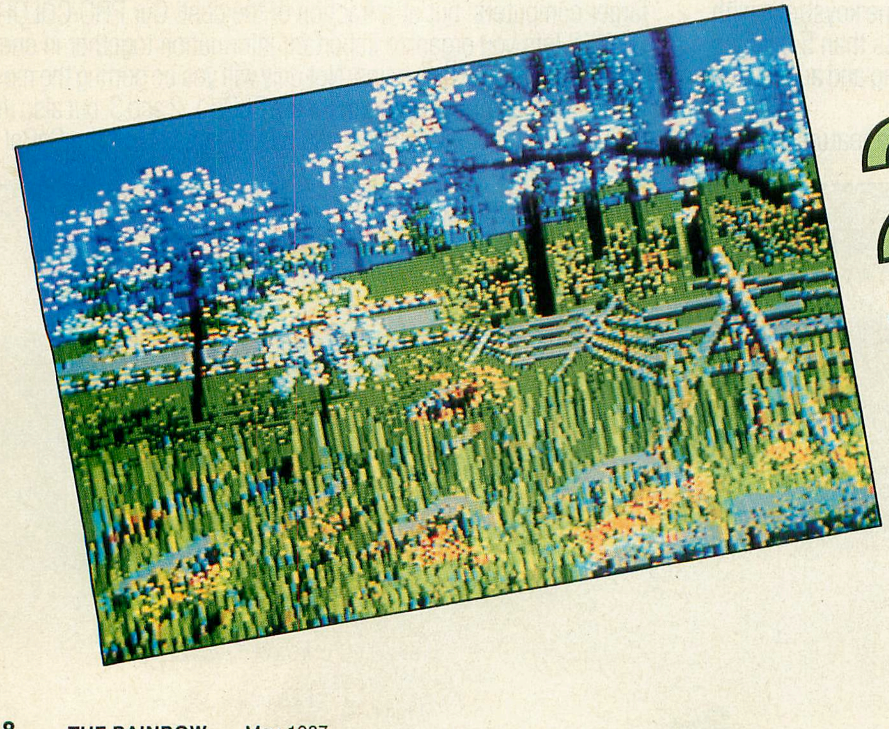


1st

COCO 3

Seascape
James Upperman
Amlin, Ohio

A still photo does not do justice to this fabulous animation. To get the full effect, download it from our Delphi CoCo SIG in the graphics database. James, an architect, created this using BASIC and the CoCo 3.



2nd

Gettysburg Battlefield
John Murvine
Ebensburg, Pennsylvania

John recreates a historical battlefield from the War Between the States. He created this in BASIC on the CoCo 3.

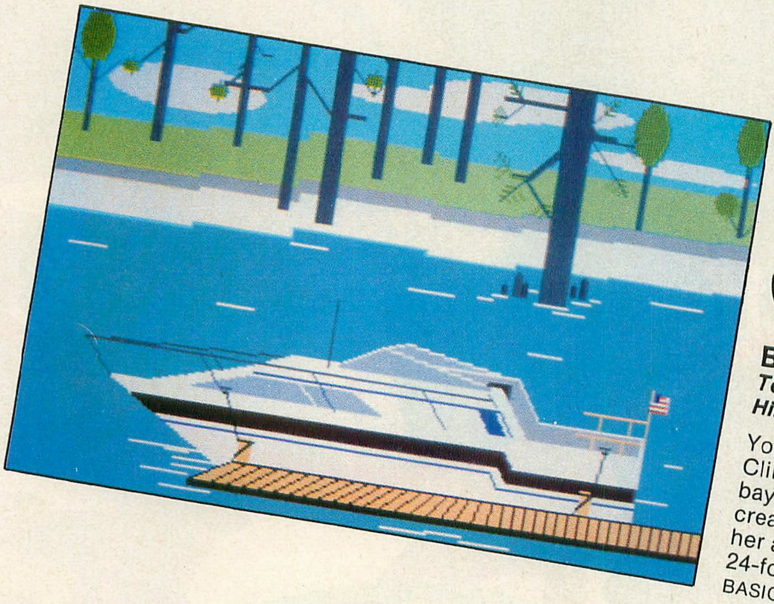
SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable mentions may also be given

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer
Curator



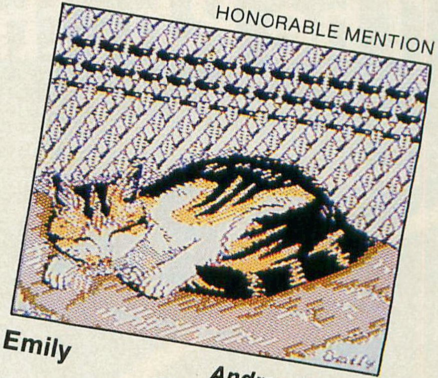
3rd

Boat

Teakie Hamrick
Hilliard, Florida

Yo, ho, ho, maties. Climb aboard for a bayliner cruise. Teakie created this picture of her and her husband's 24-foot bayliner with BASIC and the CoCo 3.

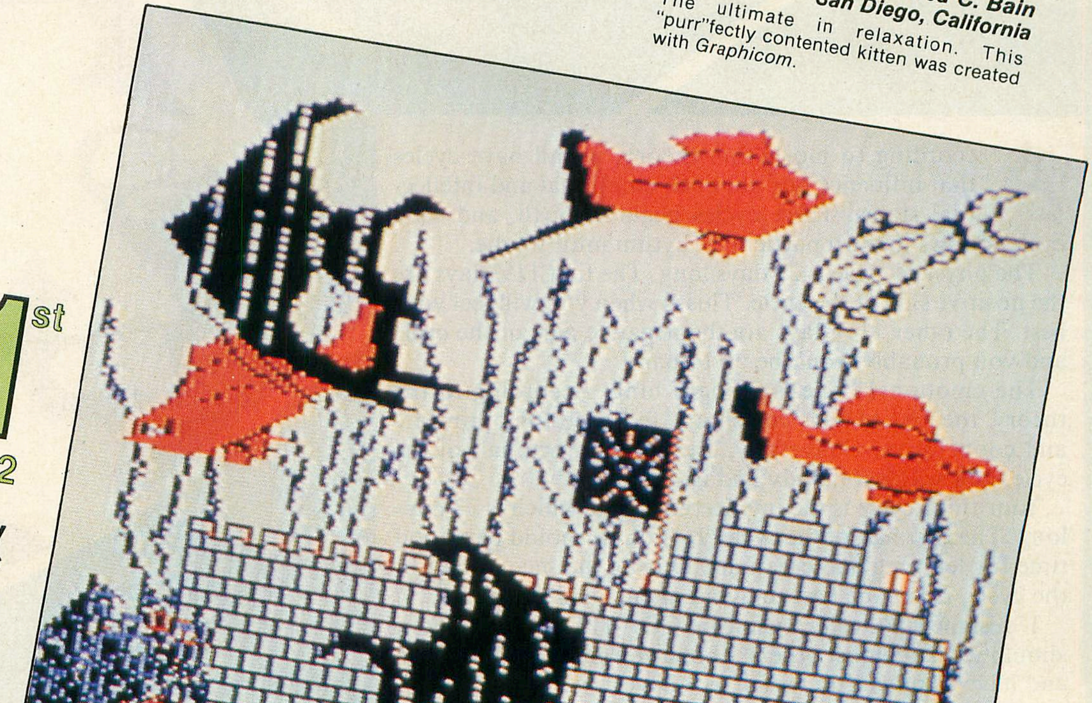
HONORABLE MENTION



Emily

Andrea C. Bain
San Diego, California

The ultimate in relaxation. This "purr"fectly contented kitten was created with *Graphicom*.



1st

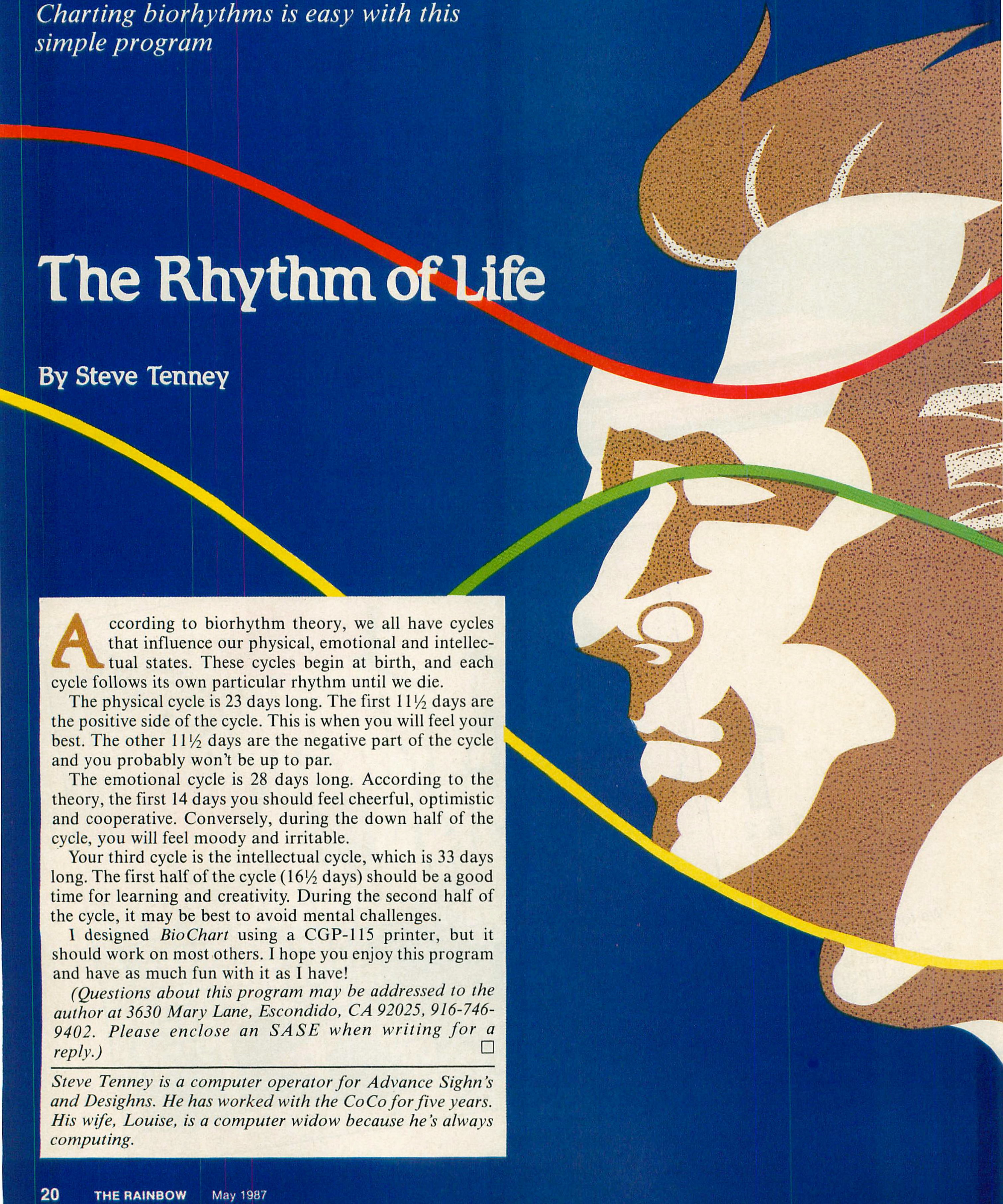
COCO 1 & 2

Something Fishy

Keith Reynolds
Noblesville, Indiana

We foreshadow summer fun with this aquatic scene. Keith is a student at IUPUI studying computer technology and created this graphic using *Graphicom* and *McPaint*.

Charting biorhythms is easy with this simple program



The Rhythm of Life

By Steve Tenney

According to biorhythm theory, we all have cycles that influence our physical, emotional and intellectual states. These cycles begin at birth, and each cycle follows its own particular rhythm until we die.

The physical cycle is 23 days long. The first 11½ days are the positive side of the cycle. This is when you will feel your best. The other 11½ days are the negative part of the cycle and you probably won't be up to par.

The emotional cycle is 28 days long. According to the theory, the first 14 days you should feel cheerful, optimistic and cooperative. Conversely, during the down half of the cycle, you will feel moody and irritable.

Your third cycle is the intellectual cycle, which is 33 days long. The first half of the cycle (16½ days) should be a good time for learning and creativity. During the second half of the cycle, it may be best to avoid mental challenges.

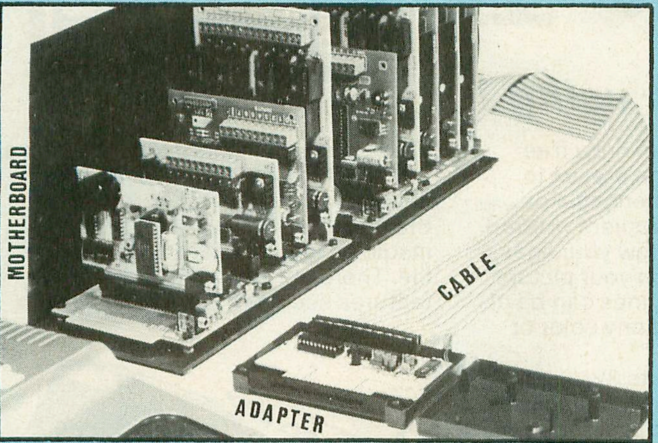
I designed *BioChart* using a CGP-115 printer, but it should work on most others. I hope you enjoy this program and have as much fun with it as I have!

(Questions about this program may be addressed to the author at 3630 Mary Lane, Escondido, CA 92025, 916-746-9402. Please enclose an SASE when writing for a reply.) □

Steve Tenney is a computer operator for Advance Sighn's and Designhs. He has worked with the CoCo for five years. His wife, Louise, is a computer widow because he's always computing.

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card RE-140: $129

Includes eight industrial relays. (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm CL-144: $89

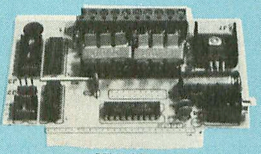
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder PH-145: $79

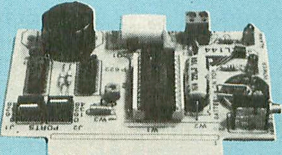
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

A-BUS Prototyping Card PR-152: $15

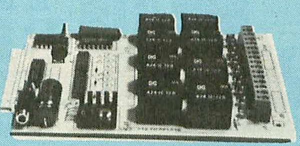
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s



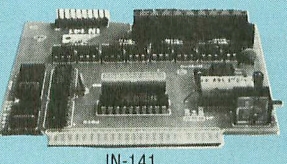
ST-143



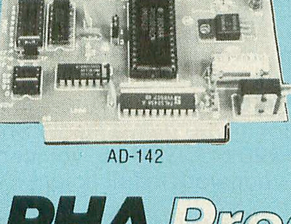
CL-144



RE-140



IN-141



AD-142

Smart Stepper Controller SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus".	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4 D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4 P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot, Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

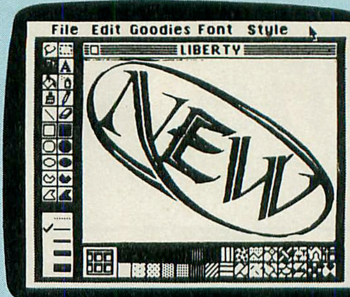
- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
NY residents add sales tax.
C.O.D. add $3.00 extra.
Canada: shipping is $5
Overseas add 10%

ALPHA Products
a division of Sigma Industries, Inc.
242 W. Avenue, Darien, CT 06820

Technical info: **(203) 656-1806**
Orders only Except in NY **800 221-0916**
New York orders: **(718) 296-5916**
All lines *open weekdays 9 to 5 Eastern time*

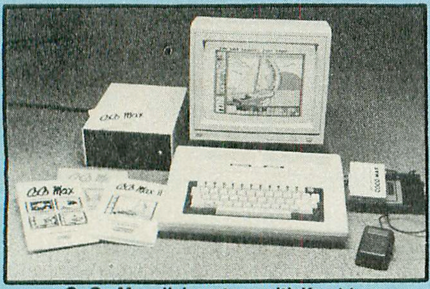
CoCo Max™ II



You'll use it all the time and love using it.

What is CoCo Max ?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.



CoCo Max disk system, with Y-cable.

Is CoCo Max for you ?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

What made CoCo Max an instant success ?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply ***pointing*** and ***clicking*** with your mouse or joystick. With ***icons*** and ***pull down menus,*** you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The ***undo*** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

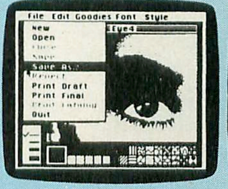
With the ***pencil*** you can draw free hand lines, then use the ***eraser*** to make corrections or changes. For straight lines, the convenient ***rubberbanding*** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The ***paint brush,*** with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple.

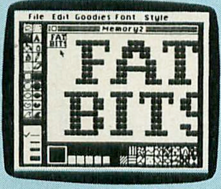
For special effects, the ***spray can*** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The ***Glyphics*** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.



Pull down menus



Zoom In !

Control Over Your Work

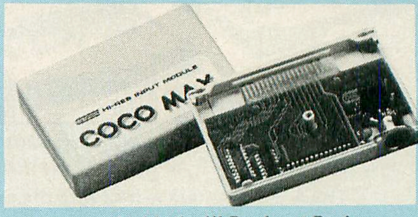
CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats: • You can move it around • Copy it • Shrink or enlarge it in both directions • Save it on the electronic ***Clipbook*** • Flip it vertically or horizontally • Rotate it • Invert it • Clear it, etc. etc.

All this is done instantly, and you can always ***undo*** it if you don't like the results.

For detail work, the ***fat bits*** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color !

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible ***lasso***.



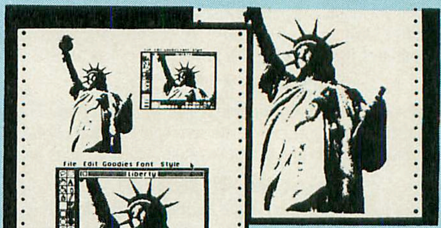
Inside the Hi-Res Input Pack

Why a Hi-Res Input Pack ?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in ***fonts*** each with 16 variations. That's over 200 typestyles !


File Edit Goodies Font Style
Liberty

Examples of printouts

Printing Your Creations

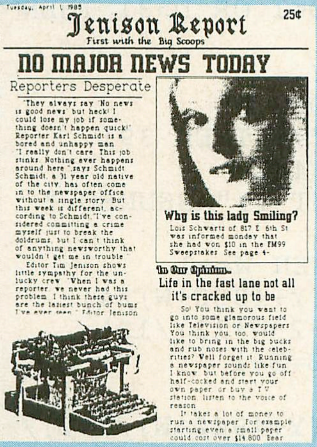
There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers !

All the CoCo Max pictures are **unretouched** screen shots or printouts (Epson RX-80).

CoCo Max II™

The whole family will enjoy CoCo Max. Here are a few examples of the possibilities.

All these pictures are **unretouched** screen photos or printouts (on an Epson RX-80).



Tuesday, April 1, 1985 25¢

Jenison Report

First with the Big Scoops

NO MAJOR NEWS TODAY

Reporters Desperate

"They always say 'No news is good news' but heck! I could lose my job if something doesn't happen quick!" Reporter Karl Schmidt is a bored and unhappy man "I really don't care This job stinks Nothing ever happens around here", says Schmidt Schmidt, a 31 year old native of the city, has often come in to the newspaper office without a single story But this week is different, according to Schmidt."I've considered committing a crime myself just to break the doldrums, but I can't think of anything newsworthy that wouldn't get me in trouble"

Editor Tim Jenison shows little sympathy for the unlucky crew "When I was a reporter, we never had this problem I think these guys are the laziest bunch of bums I've ever seen " Editor Jenison

Why is this lady Smiling?

Lois Schwartz of 817 E 6th St was informed monday that she had won $10 in the FM99 Sweepstakes See page 4-

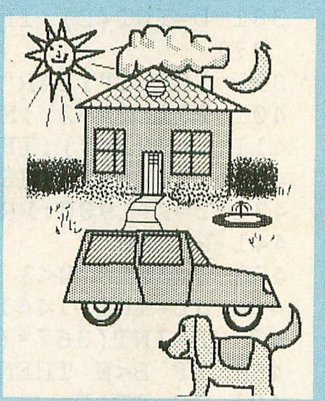
In Our Opinion..

Life in the fast lane not all it's cracked up to be

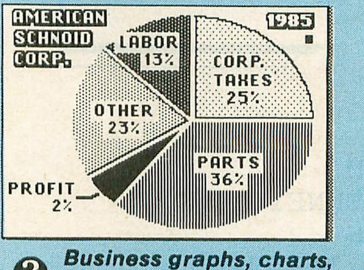
So! You think you want to go into some glamorous field like Television or Newspapers You think you, too, would like to bring in the big bucks and rub noses with the celebrities? Well forget it Running a newspaper sounds like fun I know but before you go off half-cocked and start your own paper or buy a T.V station listen to the voice of reason

It takes a lot of money to run a newspaper For example starting even a small paper could cost over $14,800 Bear

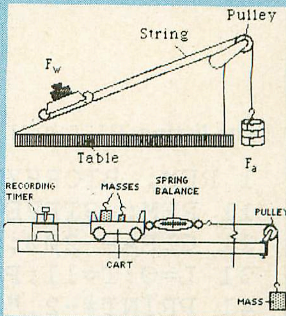
① **Publish a newsletter or bulletin**



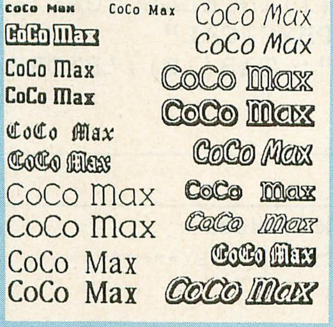
② **Fun for children while stimulating creativity.**



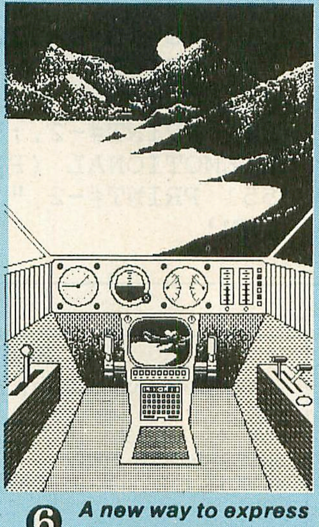
③ **Business graphs, charts, diagrams. Also memos**



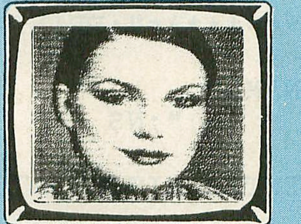
④ **Junior's homework and science projects. Term papers too !**



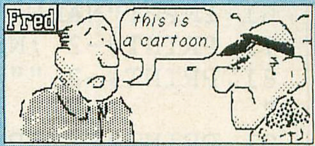
⑤ **Over 200 typestyles to choose from! generate flyers.**



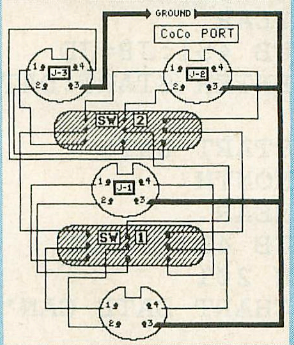
⑥ **A new way to express your imagination.**



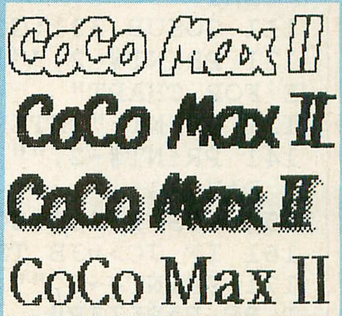
⑦ **Video portrait (with optional digitizer).**



⑧ **This is a cartoon.**



⑨ **schematics and floor plans.**



⑩ **Logos and letterheads.**

System Requirements:

Any 64K CoCo and a standard joystick or mouse. (The koala pad and the track ball work, but are not recommended.)
Disk systems need a Multi-Pak or our Y-Cable.
CoCo Max is compatible with any Radio Shack DOS and ADOS.
Note: the tape version of CoCo Max includes almost all the features of CoCo Max II except *Shrink, Stretch, Rotate,* and *Glyphics.* Also, it has 5 fonts instead of 14.
CoCo Max is not compatible with JDOS, DoubleDOS, MDOS, OS-9, the X-pad, and Daisy Wheel Printers.

Printers Supported:

Epson MX, RX, FX and LX series, Gemini, Star, Micronix, Delta 10, 10X, 15, 15X, SG-10,Okidata 82A, 92, 93, C. Itoh Pro-writer, Apple Image-writer, Hewlett-Packard Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer 8, TRP-100, CGP-220. (DMP-130 use Line Printer 8), PMC printers, Gorilla Banana.
Color printing: CGP-200, CGP-115

Pricing

CoCo Max on tape with Hi-Res Pack and manual.	$69.95
CoCo Max II (disk only) with Hi-Res Pack and manual.	$79.95
Upgrade: CoCo Max to CoCo Max II New disk and manual	$19.95
New features of CoCo Max II: 14 fonts and glyphic font, dynamic shrink and stretch, rotate, multiple drive capability, 68 page scrapbook, point and click file load, color printer drivers, full error reporting.	
Upgrade: CoCo Max tape to disk manuals, disk and binder	$24.95
Y-Cable: *Special Price*	$19.95
Super Picture Disks #1, #2, and #3	each: $14.95
All three picture disks	$29.95

Guaranteed Satisfaction
Use CoCo Max for a full month.
If you are not delighted with it,
we will refund every penny.

Font Editor Option

A font is a set of characters of a particular style. CoCo Max includes 15 fonts. You can create new fonts of letters, or even symbols or graphics with the font editor. Examples: set of symbols for electronics, foreign alphabets, etc. $19.95

Video Digitizer DS-69

This new Low Cost Digitizer is the next step in sophistication for your CoCo Max system. With the DS-69 you will be able to digitize and bring into CoCo Max a frame from any video source: VCR, tuner, or video camera. Comes complete with detailed manual and C-SEE software on disk. Multi-Pak is required.

New Low Price Save $50. . . . . $99.95
New: faster DS-69A. $149.95

COLORWARE

Colorware Incorporated
79-04A Jamaica Avenue
Woodhaven, NY 11421

800 221-0916
Orders only.
NY & Info: (718) 296-5916
Hours: 9-5 Eastern time.

Add $3.00 per order for shipping.
We accept Visa, MC, checks, M.O.
C.O.D. add $3.00 extra.
NY and CT : add sales tax.
Shipping to Canada is $5.00
Overseas, FPO, APO add 10%

231 240
451 218
751 157
END 79

The listing: BIOCHART

```
1 REM: BIORHYTHM
11 REM: STEVE TENNEY 1987
21 CLEAR 200:CLS
31 L=O:T=11:P=3.14159265
41 PRINT#-2,"";"********BIORYTHM
 BY STEVE TENNEY********":PRINT#
-2,;
51 PRINT#-2,"";"NAME"
61 INPUT"NAME         ";N$
71 PRINT#-2,;N$
81 PRINT#-2,"";"ENTER BIRTH DATE
"
91 PRINT"ENTER BIRTH DATE"
101 PRINT#-2,"";"MONTH
  DAY            YEAR
111 GOSUB 331:GOSUB 451:JB=JD
121 PRINT#-2,"";"ENTER START DAT
E FOR CHART"
131 PRINT "ENTER START DATE
141 PRINT#-2,"";"MONTH
  DAY            YEAR
151 GOSUB 331:GOSUB 451:JC=JD
161 IF JC>=JB THEN 201
171 PRINT#-2,"";"CHART DATE CAN'
T BE EARLIER"
181 PRINT#-2,"";"THAN BIRTH DATE
."
191 SOUND 8,8:PRINT#-2,"";:GOTO
81
201 FOR K=1 TO 1000:NEXT
211 GOSUB 531
221 N=JC-JB
231 V=23:GOSUB 601
241 V=28:GOSUB 601
251 V=33:GOSUB 601
261 GOSUB 781
271 PRINT#-2,""; C$;TAB(8);L$
281 JC=JC+1:L=L+1:IF L<15 THEN 2
21
291 PRINT"'E' = END, SPACE = GO
ON";
301 R$=INKEY$:IF R$="" THEN 301
311 IF R$="E" THEN 931
321 L=O:GOTO 211
331 PRINT#-2,"";
341 INPUT "MONTH(1 TO 12)";M
351 PRINT#-2,"";
361 M=INT(M):IF M<1 OR M>12 THEN
 341
371 INPUT"DAY (1 TO 31)";D
381 D=INT(D):IF D<1 OR D>31 THEN
 371
391 INPUT"YEAR";Y
401 PRINT#-2,;M,D,Y,W$
411 Y=INT(Y):IF Y<0 THEN 391
421 IF Y>99 THEN 441
431 Y=Y+1900:PRINT Y;"ASSUMED."
441 RETURN
451 W=0:IF M<3 THEN W=-1
461 JD=INT(1461*(Y+4800+W)/4)
471 B=INT(367*(M-2-W*12)/12)
481 IF B<0 THEN B=B+1
491 JD=JD+B
501 B=INT(INT(3*(Y+4900+W)/100)/
4)
511 JD=JD+D-32075-B
521 RETURN
531 CLS
541 PRINT#-2,;"(I)INTELLECTUAL (
E)EMOTIONAL (P)PHYSICAL"
551 PRINT#-2," "; TAB(10);'BIORY
THM'
```

Sample Printout

```
*******BIORYTHM BY STEVE TENNEY********
NAME
JOE X. AMPLE
ENTER BIRTH DATE
MONTH           DAY           YEAR
 3               18                 1961

ENTER START DATE FOR CHART
MONTH           DAY           YEAR
 4               15                 1987

(I)INTELLECTUAL (E)EMOTIONAL (P)PHYSICAL
           -DOWN----*----UP-

4/15/87           I          P  E
4/16/87          I             P E
4/17/87        I                 PE
4/18/87        I                  *
4/19/87       I                   *
4/20/87       I                  *
4/21/87       I                 *
4/22/87        I              *
4/23/87         I          PE
4/24/87          I       PE
4/25/87            I    PE
4/26/87              * E
4/27/87           P E  I
4/28/87         P E      I
4/29/87        PE         I
***********BIORYTHM BY STEVE TENNEY********
 725 N. FIG APT.56 ESCONDIDO CALIFORNIA 92025
THE IDEA OF THE BIORYTHM IS TO TELL YOU YOUR
HIGH AND LOW CYCLES OF THE MONTH, SO READ THE
CHART AND DETERMINE YOUR GOOD DAYS AND YOUR
BAD DAYS OF THE MONTH, FOR MORE INFORMATION
ON THE BIORYTHM CHECK WITH YOUR LOCAL LIBRARY
***************HOPE YOU ENJOY***************
```

```
561 PRINT#-2," ";"-DOWN----*----
UP-";TAB(12);
571 PRINT#-2," ";TAB(20);
581 FOR K=1 TO T+T+1:PRINT CHR$(
250);
591 NEXT:PRINT#-2," ":RETURN
601 W=INT(N/V):R=N-(W*V)
611 IF V<>23 THEN 661
621 L$=CHR$(32):FOR K=1 TO 4
631 L$=L$+L$:NEXT
641 L$=LEFT$(L$,T)+CHR$(30 )+LEF
T$(L$,T)
651 IF V=23 THEN C$="P"
661 IF V=28 THEN C$="E"
671 IF V=33 THEN C$="I"
681 W=R/V:W=W*2*P
691 W=T*SIN(W):W=W+T+1.5
701 W=INT(W):A$=MID$(L$,W,1)
711 IF A$="P" OR A$="E" OR A$="*
" THEN C$="*"
721 IF W=1 THEN 761
731 IF W=T+T+1 THEN 771
741 L$=LEFT$(L$,W-1)+C$+RIGHT$(L
$,T+T+1-W)
751 RETURN
761 L$=C$+RIGHT$(L$,T+T):RETURN
771 L$=LEFT$(L$,T+T)+C$:RETURN
781 W=JC+68569:R=INT(4*W/146097)
791 W=W-INT((146097*R+3)/4)
801 Y=INT(4000*(W+1)/1461001)
811 W=W-INT(1461*Y/4)+31
821 M=INT(80*W/2447)
831 D=W-INT(2447*M/80)
841 W=INT(M/11):M=M+2-12*W
851 Y=100*(R-49)+Y+W
861 A$=STR$(M):W=LEN(A$)-1
871 C$=MID$(A$,2,W)+"/"
881 A$=STR$(D):W=LEN(A$)-1
891 C$=C$+MID$(A$,2,W)+"/"
901 A$=STR$(Y):W=LEN(A$)-1
911 C$=C$+MID$(A$,W,2)
921 RETURN
931 PRINT#-2,;"***********BIORY
THM BY STEVE TENNEY********"
941 PRINT#-2,;" 725 N. FIG APT.5
6 ESCONDIDO CALIFORNIA 92025"
951 PRINT#-2,;"THE IDEA OF THE B
IORYTHM IS TO TELL YOU YOUR"
961 PRINT#-2,;"HIGH AND LOW CYCL
ES OF THE MONTH, SO READ THE"
971 PRINT#-2,;"CHART AND DETERMI
NE YOUR GOOD DAYS AND YOUR"
981 PRINT#-2,;"BAD DAYS OF THE M
ONTH, FOR MORE INFORMATION"
991 PRINT#-2,;"ON THE BIORYTHM C
HECK WITH YOUR LOCAL LIBRARY"
1001 PRINT#-2,;"***************
HOPE YOU ENJOY***************"
```

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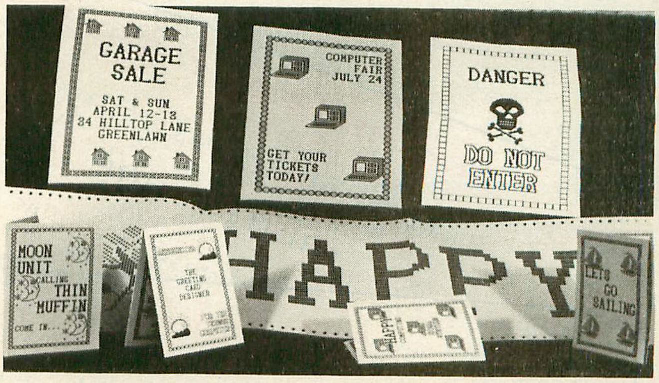

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16K
ECB

That's the Ticket

By Kathryn Rocci

Planning a neighborhood dance? How about a Christmas party for work? Now you can custom-design tickets using a CGP-220 printer and *Ticket-Wicket*.

With the auto-numbering feature, you can easily keep track of your tickets. Other features include options to choose the size of line feed, number of tickets printed, color of each line, size of print in each line, individual line placement (left-centered-right), and, if necessary, date and time are available too.

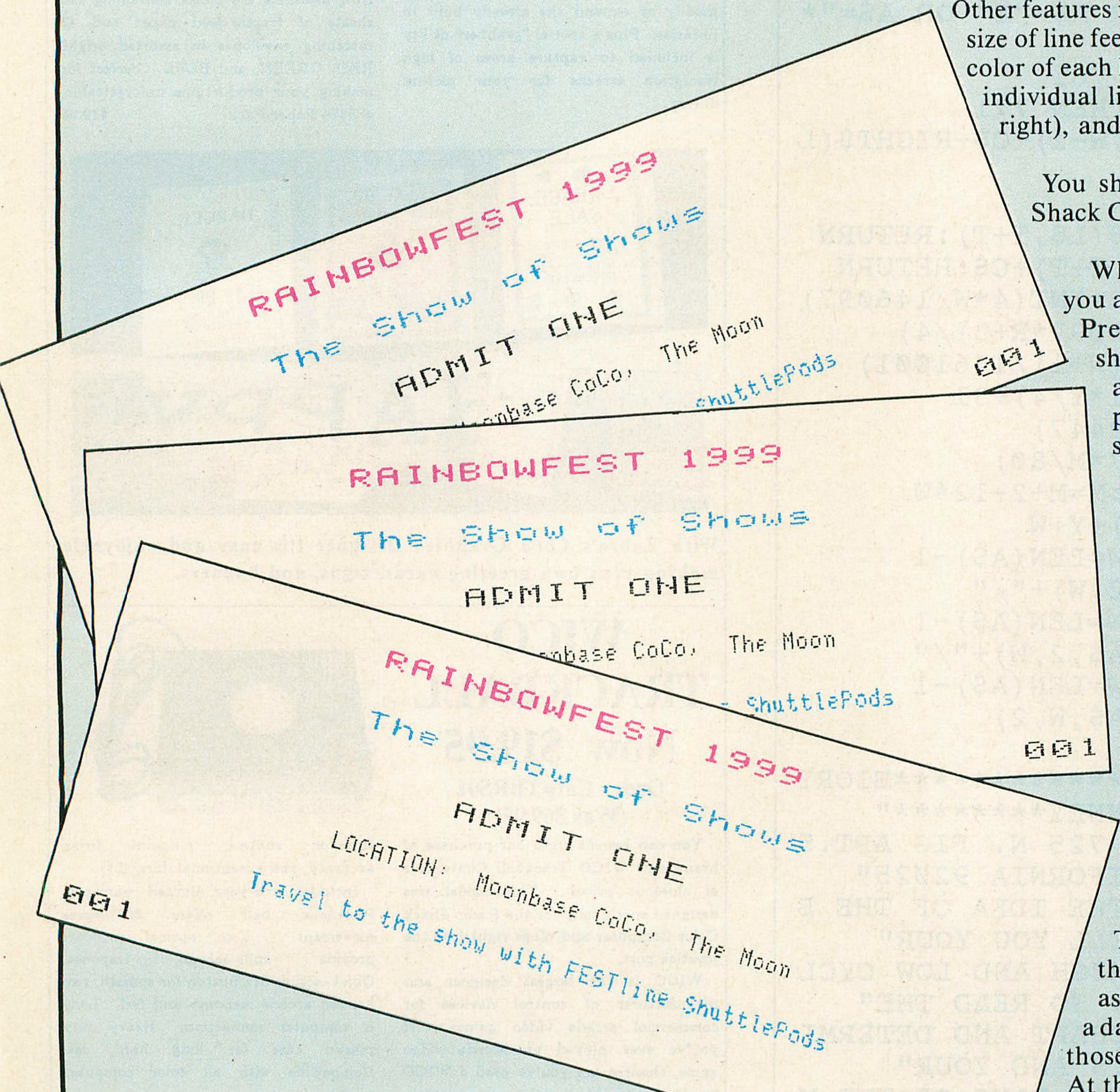
You should use roll paper (Radio Shack Catalog No. 26-1333) so it can print continuously.

When you run *Ticket-Wicket*, you are greeted with a title screen. Press any key to continue. I should mention a feature that allows only the answer prompted to be entered. This should eliminate errors in formatting your tickets.

After you have answered the first few prompts, you will see a "Line 1" prompt. This is where you enter the first line of the ticket. Once you have entered and set the standards for each line, you will come to a "Date" prompt. If a date and time are necessary, enter it in a *month day, year* format (May 1, 1987). Use this format for time: (0)0:00 p.m. or a.m. Certain times will not require the extra space. This has been considered and the margins will be determined as needed. If you do not require a date or time, simply enter X and those prompts will be passed over.

At this point printing begins. The screen is updated with the ticket number being printed. ☐

(Questions about this program may be addressed to the author at 5 Dukes Drive, Sandwich, MA 02563. Please enclose an SASE for a reply.) ☐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001

Kathryn Rocci lives in Sandwich, Massachusetts, is a self-taught programmer and has owned her CoCo for two years. Besides her family, Kathryn enjoys programming and woodworking.

Line	**Function**
10-240	Creates title screen.
260	Sets 2400 printer baud rate.
360	Sets printer line-feed size.
450-700	For-Next loop to input each line and its standards.
710-830	Date and Time information and color.
850	Starts printing loop.
870	Prints dotted black line between tickets.
880	Starts printing loop for number of lines specified.
890-940	Sets specified margins for each line.
950	Sends codes to printer for print size.
960	Sends codes to printer for color.
970	Sends tab size to printer for margins.
990	Determines if user wants Date and Time.
1010	Codes for standard print size and color for Date/Time.
1020	Sets margins and prints Date/Time.
1060	Sets color to black and size to elongated.
1070	Prints ticket number.
1080	Sets print size back to standard.
1090	Prints dotted line after last ticket.
1100	Continues printing loop back to Line 850 for the next ticket.

200	70
360	192
580	158
780	251
950	211
END	112

The listing: TICKET

```
10 CLS
20 P$=CHR$(143+16*X) + CHR$(143+
16*X) + CHR$(143+16*X) + CHR$(14
3+16*X)
30 M$="**************************
*******"
40 W$="*
       *"
50 Q$=CHR$(129+16) + CHR$(132+32
) + CHR$(133+48) + CHR$(134+64)
+ CHR$(139+80) + CHR$(142+96) +
CHR$(141+112) + CHR$(128)
60 PRINT@32,Q$;Q$;Q$;Q$
70 PRINT@ 96,M$
80 PRINT@128,W$
90 PRINT @ 160,"*          ticket-w
icket          *";
100 PRINT@192,W$
110 PRINT@ 224,"*     for the cgp-
220 printer     *";
120 PRINT@256,W$
130 PRINT@288,M$
140 PRINT@320,"*          by  kathr
yn rocci        *"
150 PRINT@352,M$
160 PRINT@416,Q$;Q$;Q$;Q$
170 FOR X=1TO7
180 PLAY STR$(X):PLAY STR$(X+1)
190 P$=CHR$(143+16*X) + CHR$(143
+16*X) + CHR$(143+16*X) + CHR$(1
43+16*X)
200 PRINT@2,P$;P$;P$;P$;P$;P$;P$
;
210 PRINT@482,P$;P$;P$;P$;P$;P$;
P$;
220 I$=INKEY$:IF I$=""THEN 230 E
LSE 250
230 NEXT X
240 GOTO 170
250 CLS:FOR K=1 TO 512 STEP 32:P
RINT@4+K,"IS YOUR PRINTER READY"
;:FOR G=1 TO 100:NEXT G,K
260 CLS:POKE 150,18 'set 2400 ba
ud
270 DIM L$(100):DIM SZ$(100):DIM
 CL$(100):DIM PL$(100):DIM BB$(1
00):DIM B(150)
280 CLS4:PRINT@198,"STANDARD LIN
E FEED=S";
290 PRINT@264,"3/4 LINE FEED=T";
300 PRINT@332,"S OR T";
310 PRINT@399,"";
320 LINEINPUT LF$
330 IF ASC(LF$)<83 OR ASC(LF$)>8
4 THEN 280
340 IF ASC(LF$)=83 THEN C=54
350 IF ASC(LF$)=84 THEN C=56
360 PRINT#-2,CHR$(27);CHR$(C)'se
t 3/4 lf
370 CLS3:PRINT@261,"# OF TICKETS
 WANTED?";:PRINT@333,"";
380 LINEINPUT N$
390 N=VAL(N$)
400 Z=ASC(N$):IF Z<48 OR Z>57 TH
EN 370
410 CLS2:PRINT @ 261,"# OF LINES
 PER TICKET?";:PRINT@333,"";
420 LINEINPUT LP$
430 Y=ASC(LP$):IF Y<48 OR  Y>57
THEN 410
440 LP=VAL(LP$)
450 CLS4: FOR A = 1 TO LP
460 PRINT"<LINE:> "A"?";:LINEINP
UT L$(A)
470 T(A)=LEN(L$(A))
480 PRINT"<PRINT SIZE:> LINE "A;
490 PRINT
500 PRINT"STANDARD=15   ELONGATE
D=14";:PRINT
510 LINEINPUT SZ$(A)
520 SZ(A)=VAL(SZ$(A))
530 IF SZ(A)<14 OR SZ(A)>15 THEN
 SOUND 20,3:CLS4:GOTO480
540 IF SZ(A)=14 AND T(A)>45 THEN
```

```
 SOUND 20,6:CLS4:GOTO 460
550 IF SZ(A)=15 AND T(A)>91 THEN
 SOUND 20,6:CLS4:GOTO 460
560 PRINT"<COLOR:> LINE "A;
570 PRINT
580 PRINT"BLK=48   RED=49   GR=50
 YEL=51   VLT=52   PK=53    BL=54"
;
590 PRINT
600 LINEINPUT CL$(A)
610 CL(A)=VAL(CL$(A))
620 IF CL(A)<48 OR CL(A)>54 THEN
 SOUND 20,3:CLS4:GOTO 560
630 PRINT"<LINE PLACEMENT:> LINE
 "A;
640 PRINT
650 PRINT"LEFT=L     CENTERED=C
 RIGHT=R";
660 PRINT
670 LINEINPUT PL$(A)
680 IF ASC(PL$(A))=67 OR ASC(PL$
(A))=76 OR ASC(PL$(A))=82 THEN 7
00 ELSE 690
690 SOUND 20,3:CLS4:GOTO 630
700 NEXT A
710 PRINT"<DATE:> X=SKIP DATE AN
D TIME";:PRINT
720 LINEINPUT DT$
730 IF LEFT$(DT$,1)="X" THEN 840
740 PRINT"<TIME:>";:PRINT
750 LINEINPUT TM$
760 TM=LEN(TM$)
770 IF TM=9 THEN TT=82 ELSE TT=8
1
780 PRINT"<COLOR FOR DATE AND TI
ME>";:PRINT
790 PRINT"<DATE AND TIME=STANDAR
D PRINT>";:PRINT
800 PRINT"BLK=48   RED=49   GR=50
 YEL=51   VLT=52   PK=53    BL=54"
;:PRINT
810 LINEINPUT DC$
820 DC=VAL(DC$)
830 IF DC<48 OR DC>54 THEN SOUND
 20,3:CLS4:GOTO 780
840 WW$="-----------------------
--------------------------------
--------------------------------

--------------------------------
---"
850 FOR B=1 TO N
860 CLS4:PRINT@228,"NOW PRINTING
 TICKET #"B;
870 PRINT#-2,CHR$(27);CHR$(84);C
HR$(48)WW$
880 FOR A=1 TO LP
890 IF SZ(A)=14 AND PL$(A)="C" T
HEN TB(A)=((91/2)-T(A))/2
900 IF SZ(A)=15 AND PL$(A)="C" T
HEN TB(A)=(91-T(A))/2
910 IF SZ(A)=14 AND PL$(A)="L" T
HEN TB(A)=5
920 IF SZ(A)=15 AND PL$(A)="L" T
HEN TB(A)=10
930 IF SZ(A)=14 AND PL$(A)="R" T
HEN TB(A)=((91/2)-T(A))-5
940 IF SZ(A)=15 AND PL$(A)="R" T
HEN TB(A)=(91-T(A))-10
950 PRINT#-2,CHR$(27);CHR$(SZ(A)
)
960 PRINT#-2,CHR$(27);CHR$(84);C
HR$(CL(A))
970 PRINT#-2,TAB(TB(A))L$(A)
980 NEXT A
990 IF LEFT$(DT$,1)="X" THEN 103
0
1000 PRINT#-2
1010 PRINT#-2,CHR$(27);CHR$(15);
CHR$(27);CHR$(84);CHR$(DC);
1020 PRINT#-2,TAB(5)DT$TAB(TT)TM
$
1030 IF B<10 THEN BB$="      00#
      "
1040 IF B>9 THEN BB$="      0##
       "
1050 IF B>99 THEN BB$="      ###
      "
1060 PRINT#-2,CHR$(27);CHR$(84);
CHR$(48);CHR$(27);CHR$(14):PRINT
#-2
1070 PRINT#-2,USING BB$;B,B
1080 PRINT#-2,CHR$(27);CHR$(15)
1090 IF B=N THEN PRINT#-2,WW$
1100 NEXT B
```

One-Liner Contest Winner . . .

This program, intended for the DMP-105, will print out your disk directory. Change or remove the control codes if you own a different printer.

The listing:

```
10 CLS:INPUT"NAME OF DISK";N$:IN
PUT"SIDE";S:PRINT #-2,CHR$(27);C
HR$(31);CHR$(27);CHR$(20);N$;CHR
$(32);CHR$(32);"SIDE:";S;CHR$(27
);CHR$(32);CHR$(27);CHR$(19):POK
E 111,254:DIR:PRINT #-2,CHR$(13)
:GOTO 10
```

Joon Y. Kim
Bristol, TN

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

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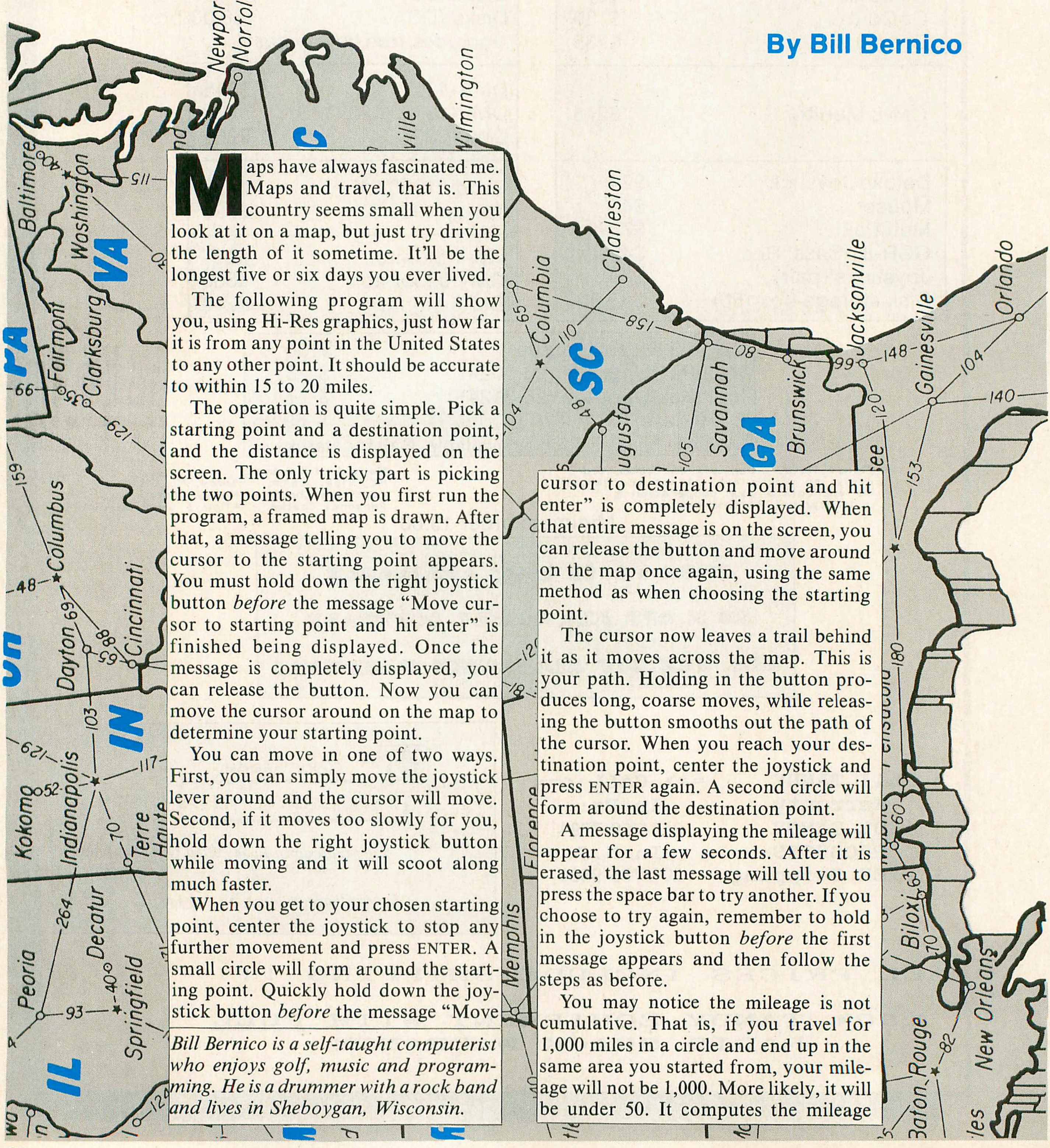
16K ECB

Get Chart Smart With Mileage Mapper

By Bill Bernico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Biloxi
New Orleans
Baton Rouge
PA
VA
SC
GA
IN
IL
115
66
48
69
103
117
264
93
40
65
110
158
80
99
148
104
140
120
153
180
63
70
82

Maps have always fascinated me. Maps and travel, that is. This country seems small when you look at it on a map, but just try driving the length of it sometime. It'll be the longest five or six days you ever lived.

The following program will show you, using Hi-Res graphics, just how far it is from any point in the United States to any other point. It should be accurate to within 15 to 20 miles.

The operation is quite simple. Pick a starting point and a destination point, and the distance is displayed on the screen. The only tricky part is picking the two points. When you first run the program, a framed map is drawn. After that, a message telling you to move the cursor to the starting point appears. You must hold down the right joystick button *before* the message "Move cursor to starting point and hit enter" is finished being displayed. Once the message is completely displayed, you can release the button. Now you can move the cursor around on the map to determine your starting point.

You can move in one of two ways. First, you can simply move the joystick lever around and the cursor will move. Second, if it moves too slowly for you, hold down the right joystick button while moving and it will scoot along much faster.

When you get to your chosen starting point, center the joystick to stop any further movement and press ENTER. A small circle will form around the starting point. Quickly hold down the joystick button *before* the message "Move cursor to destination point and hit enter" is completely displayed. When that entire message is on the screen, you can release the button and move around on the map once again, using the same method as when choosing the starting point.

The cursor now leaves a trail behind it as it moves across the map. This is your path. Holding in the button produces long, coarse moves, while releasing the button smooths out the path of the cursor. When you reach your destination point, center the joystick and press ENTER again. A second circle will form around the destination point.

A message displaying the mileage will appear for a few seconds. After it is erased, the last message will tell you to press the space bar to try another. If you choose to try again, remember to hold in the joystick button *before* the first message appears and then follow the steps as before.

You may notice the mileage is not cumulative. That is, if you travel for 1,000 miles in a circle and end up in the same area you started from, your mileage will not be 1,000. More likely, it will be under 50. It computes the mileage

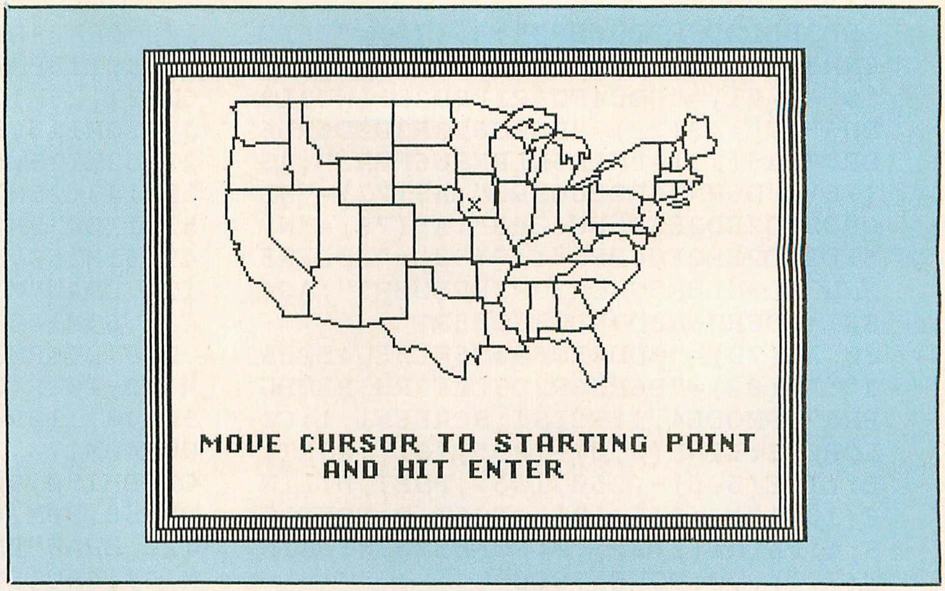
Bill Bernico is a self-taught computerist who enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wisconsin.

from one point to another. Still, it's a nifty way to calculate distances in the U.S.

My thanks to one of my pen pals, Matt Krom, for assisting with some of the subroutines.

(Questions about this program may be directed to Mr. Bernico at 708 Michigan Avenue, Sheboygan, WI 53081, 414-459-7350. Please include an SASE for a reply when writing.) □

Editors Note: This program contains packed lines. If the computer won't allow you to enter the last few characters of a given line, go ahead and press ENTER. Then type `EDIT` *line number* and press X to enter the editor's "extend" mode. Now you can enter the remaining characters of that line.



```
MOVE CURSOR TO STARTING POINT
AND HIT ENTER
```

50	170
80	166
120	164
190	211
410	8
END	176

The listing: DISTANCE

```
10 CLEAR500:DIMA$(90),A(1,2):D$(
0)="H5":D$(1)="L5":D$(2)="G5":D$
(3)="U5":D$(5)="D5":D$(6)="E5":D
$(7)="R5":D$(8)="F5":A$(32)="BR6
":A$(48)="BDD4FU6R3D6NL3EU4BUBR3
":A$(49)="BDED6RU6BR3":A$(50)="B
DRUR2DRG4DNE4R4BU6BR3":A$(51)="R
5LD2NL3D4L3HBR5U2BU3BR3
20 A$(52)="BR3G3DR6L2U4D6RU6BR3"
:A$(53)="ND2R5L4D2R3D4L3HBR5U2BU
3BR3":A$(54)="BR4L2DLGD3FNU4R3U3
NL3FDBU5BR3":A$(86)="D6RNU6R2EU5
RND4BR3":A$(87)="D6RNU6R3U6RD6R2
EU5RND4BR3":A$(89)="D2FNU3RD3RU3
RU3RND2BR3":A$(85)="D5FNU6R3U6RN
D5BR3":A$(84)="R2D6RU6R2BR3
30 A$(55)="R5DRG4DNRE4U2BR3":A$(
56)="BRNR3D6HUBU2UF2R2D3NL3EUBU2
UHND6BR4":A$(57)="BRNR3D3HNUFR3U
3D4G2LR2E2U3BUBR3":A$(58)="BDDBD
2DRUBU2UBUBR3":A$(59)="DBD2D2BGR
U2BU2UBR3":A$(60)="BR3G3F3RH3E3N
R3":A$(61)="BD2R4BD2L4BU4BR7":A$
(62)="F3G3RE3H3BR6
40 A$(63)="BDER3DG2DE3DG2BD2LBU6
BR6":A$(65)="BDD5RU6R3D4NL3D2RU5
BUBR3":A$(66)="D6RU6R3DRNDLD2NL3
DRNDLD2L3BU6BR7":A$(67)="BDD4RDU
6R2FBD4GL2BU6BR6":A$(68)="D6RU6R
3D6ENU4GL3BU6BR7":A$(69)="D6RU6R
```

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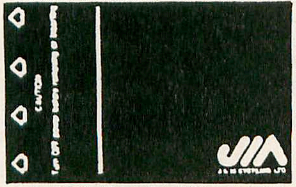

The JFD-EConomical controller combines the best features of the original JFD-COCO with the two switchable ROM sockets, fully buffered data lines and Memory Minder in ROM. The JFD-EC replaces the JFD-COCO in our product line at an even lower price. The controller includes JDOS, the JDOS manual and Memory Minder in ROM. (Precision Alignment Disk not included.)

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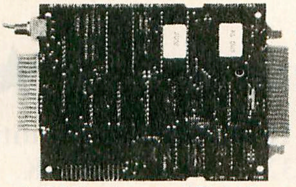

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```
3BD3BLL2D3R3BU6BR3":A$(70)="D6RU
6NR3D3R2BU3BR4
50 A$(71)="BDD4FU6R3FBD2D3LNU3L3
BU6BR7":A$(72)="D6RU6D3R3U3D6RU6
BR3":A$(73)="NLD6NLRNRU6RBR3":A$
(76)="D6RNU6R2BU6BR3":A$(77)="ND
6RD2ED2ED2E3D5RU6BR3":A$(78)="ND
6FD2ED2ED2FU6BR3":A$(83)="BDDFRF
2NH3DL3ULBR5UHDH3UR3DRBUBR3":A$(
80)="D6RU6R3D3NL3EUBUBR3
60 A$(79)="BDD4FU6R3D6NL3EU4BUBR
3":A$(82)="D6RU6R3D3L2F3RH3REUBU
BR3":PMODE4,1:PCLS1:SCREEN1,1:CO
LOR0,1:LINE(0,0)-(255,191),PSET,
B:LINE(5,5)-(250,186),PSET,B:LIN
E(10,10)-(245,181),PSET,B:POKE17
8,1:PAINT(2,2),,0:POKE178,2:PAIN
T(7,7),,0:POKE178,0
70 DRAW"BM36,20D2L2F2D7M33,47M32
,64M35,75R2D2L2M41,89M45,90M54,1
01D2R10M77,107R10UR5M97,112D3M10
3,117M104,115M109,116M116,125M12
4,128U6M126,118M129,122M130,115R
9M141,117R7M145,113M156,112M160,
114M163,112M167,118D3M171,127D2M
173,131M178,129U8M177,116
80 DRAW"M172,107M175,102M178,101
M179,98M191,85M189,75M193,77M194
,75U3R3M200,65M198,64M199,61M197
,59M207,56M212,53U2R2DM215,51U2L
2UL2U6M220,40M221,35M218,34U8M21
5,27M210,25M207,35M204,36L12M181
,43L3M174,47R2D2L2M163,54M168,43
U3R2D2R2U2M169,34M159,32
90 DRAW"U7L4U2M147,22M142,25M126
,20L90BM36,34M39,35D2M48,36R9M57
,20D24M55,46M58,47D6BM32,54R43BM
49,54D18M65,87M67,90M64,93D10BM6
8,54D30L3D3BM62,20D8R2D8M67,37M6
9,44R7NU2D16R21U40BM75,42R22BM76
,60R29BM84,60D47BM68,81R59BM105,
60D21BM102,81D23M92,104D2
100 DRAW"BM102,84R10D9M119,96R12
M133,115BM127,81D2R2D14BM119,20D
6M121,29M118,37NL21M121,40D14M11
8,53GM115,53L18BM121,53M123,56M1
22,62M125,66M127,69D12BM105,66R2
0BM143,25M136,32D2L2M134,40M137,
51R11DR2BM121,48R14M137,65U13BM1
49,51M150,53M151,56D4
110 DRAW"M149,73M145,75M143,78BM
137,65M145,81D3L3U2L14BM142,84M1
37,97DL6BM137,97M139,100M138,103
M140,108R4M145,113BM139,90R29BL1
9M148,112R4U4R8M158,90BM159,109R
9UR4BM173,104M168,93DL2M169,89R5
DR6BM180,90M183,93BM144,83R4UR41
BM158,90M160,87R3M168,82
120 DRAW"BM149,73M150,74M153,72R
M160,69U15D13M161,69FM165,70M170
,78R3M174,74M177,73M178,72M181,7
1M187,72M189,77BM163,81M168,78BM
136,31M140,30M144,34R2M148,40M15
1,38M149,44M148,51BM142,31M150,2
7M149,30M152,31M156,29M159,33M15
5,34M150,35M149,39BM159,33
130 DRAW"M155,37M153,43D4M150,53
BM157,35M161,37D7R2U3M165,42M166
,47BM150,54R19M176,50U3M183,44FB
M172,52D16M191,68M194,69D3BM189,
68D3R6BM172,64M169,67M164,70BM17
5,68D4R5BM175,51D4R13M193,58R4U9
R2U12BM192,58M191,63M193,64M191,
68BM197,51R12M210,54
140 DRAW"BM205,51D6BM199,46M207,
47M210,44BM204,36M205,39M203,43D
4BM209,32M208,35M209,43RBM202,60
M209,58M210,60M206,61M202,60BM12
5,65R12BM22,150":A$="MOVE CURSOR
 TO STARTING POINT":GOSUB590:DRA
W"BM70,160":A$="AND HIT ENTER.":
GOSUB590:H=128:V=60
150 GET(H-2,V-2)-(H+2,V+2),A:LIN
E(H-2,V-2)-(H+2,V+2),PSET:LINE(H
+2,V-2)-(H-2,V+2),PSET
160 GOSUB510
170 IF PEEK(338)=191 THEN 280
180 F=0:G=0
190 IF X<5 AND H<>3 THEN F=-1
200 IF X>58 AND H<>252 THEN F=1
210 IF Y<5 AND V<>3 GOSUB270:V=V
-1:GOTO150
220 IF Y<5 AND V<>3 THEN G=-1
230 IF Y>58 AND V<>140 THEN G=1
240 IF F=0 AND G=0 THEN 160
250 IF XY=1 THEN IF (H+F*5)>3 AN
D (H+F*5)<252 AND (V+G*5)>3 AND
(V+G*5)<140 THEN F=F*5:G=G*5
260 GOSUB270:H=H+F:V=V+G:GOTO150
270 PUT(H-2,V-2)-(H+2,V+2),A:RET
URN
```

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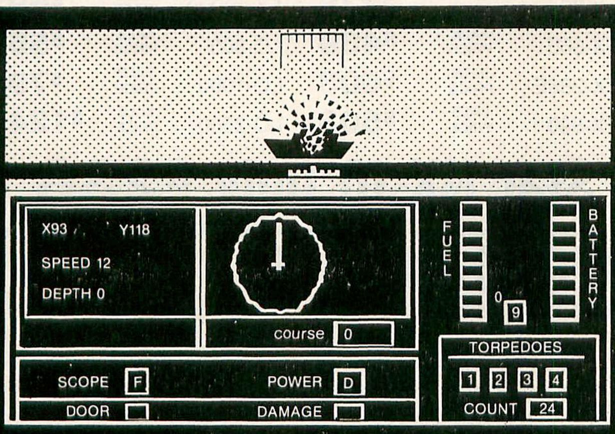

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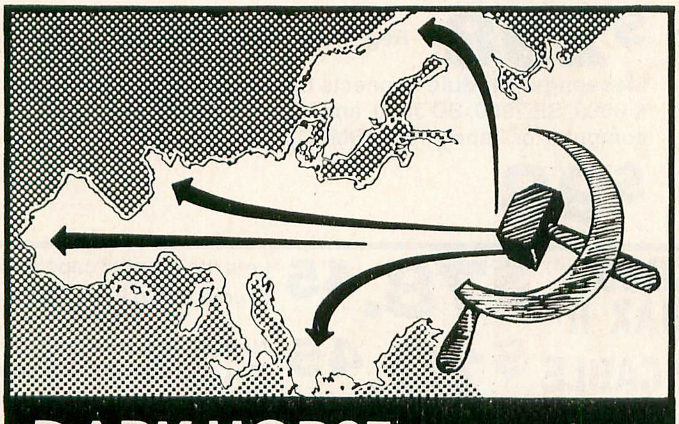

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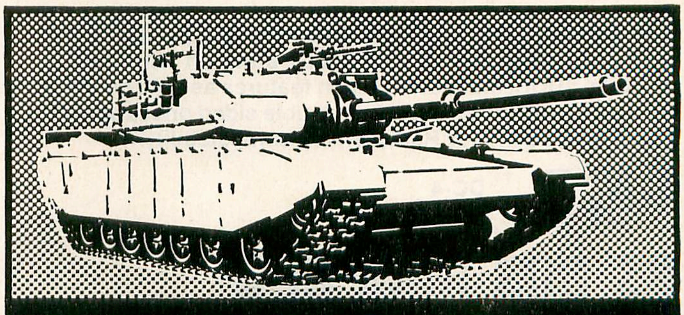

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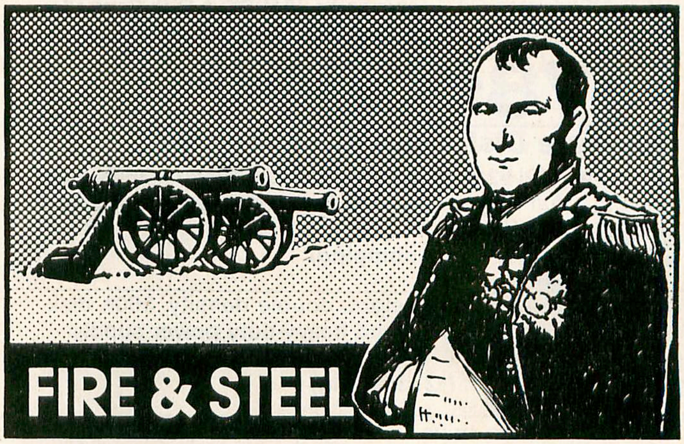
You become General Von Paulus in command of the German Sixth Army consisting of Panzers, Infantry, Mechanized Units, with support from Bombers and Fighters of the dreaded Luftwaffe. Starting in the summer of 1942 you begin your offensive knowing that you have only so much time to take control of the city and then defend it from overwhelming Russian counterattack. **Completely high resolution graphics for ECB 64K CoCo I, II, III disk or tape. Colorless on RGB monitors. $28.00**



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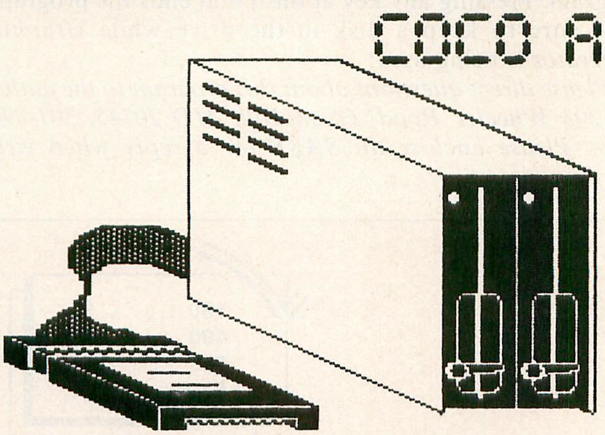
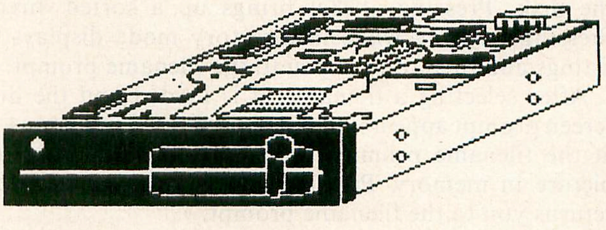
```
280 X$=INKEY$:GOSUB270:SH=H:SV=V
:CIRCLE(H,V),5
290 LINE(20,145)-(240,180),PRESE
T,BF:DRAW"BM26,150":A$="MOVE CUR
SOR TO DESTINATION":GOSUB590:DRA
W"BM52,160":A$="POINT AND HIT EN
TER.":GOSUB590:A$="BM=M;,=N;":C$
="NUNDNRNLNENFNGNH
300 IFXY=0THENH=H+F:V=V+G:DRAW"B
M=H;,=V;"+C$:GOTO320
310 M=H:N=V:H=H+F*5:V=V+G*5:MN=F
*3+G+4:B$=D$(MN):DRAW"XA$;XB$;XA
$;UXB$;XA$;LXB$;XA$;DXB$;XA$;RXB
$;"
320 F=0:G=0:GOSUB510
330 IF Y>58THEN G=1
340 IF Y<5THEN G=-1
350 IF X>58THEN F=1
360 IF X<5THEN F=-1
370 IF PEEK(338)=191 THEN 450
380 IF PEEK(344)=253 THEN RUN
390 IF PEEK(339)=251 THEN CLS:LI
ST-40:END
400 IF H>245 THEN F=-1
410 IF H<10 THEN F=1
420 IF V>131 THEN G=-1
430 IF V<10 THEN G=1
440 GOTO 300
450 CIRCLE(H,V),5:HD=ABS(SH-H):V
D=ABS(SV-V)
460 D=SQR((HD^2)+(VD^2)):D=INT(D
*18.75)
470 D$=STR$(D):IF D>999 THEN D$=
LEFT$(D$,LEN(D$)-3)+","+RIGHT$(D
$,3)
480 GOSUB600:A$="THE DISTANCE BE
TWEEN THE TWO":GOSUB590:DRAW"BM5
0,160":A$="POINTS IS"+D$+" MILES
.":GOSUB590:FORX=1TO2000:NEXT:GO
SUB600:A$="HIT SPACEBAR TO TRY A
NOTHER":GOSUB590
490 IFINKEY$<>CHR$(32)THEN490
500 HD=0:VD=0:GOTO60
510 X=JOYSTK(0):Y=JOYSTK(1):XY=0
520 IF PEEK(341)=247 THEN Y=0
530 IF PEEK(342)=247 THEN Y=63
540 IF PEEK(343)=247 THEN X=0
550 IF PEEK(344)=247 THEN X=63
560 IF PEEK(339)=191 THEN XY=1
570 IF PEEK(65280)=126 OR PEEK(6
5280)=254 THEN XY=1
580 RETURN
590 FORX=1TOLEN(A$):Y=ASC(MID$(A
$,X,1)):DRAWA$(Y):NEXT:RETURN
600 LINE(20,145)-(240,180),PRESE
T,BF:DRAW"BM26,150":RETURN
```





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PRINTER UTILITY

32K DISK

An easy-to-use screen dump for Tandy printers

The Spit and Image

By Allen Snook

Graphics Generator is a utility that takes portions of the Hi-Res `PMODE4` screen and generates a program that when run, reproduces the image, bit-for-bit, on any Tandy-compatible printer with seven pins and a dot-addressable graphics mode.

After you have loaded and run *Graphics Generator*, it prompts for the filename of a `PMODE4` picture to load from the disk. Pressing ENTER brings up a sorted directory. Pressing any key while in directory mode displays more listings and then returns you to the filename prompt.

After selecting a filename, it is loaded and the display screen prompt appears. This also appears if you press ENTER at the filename prompt. Pressing Y displays the current picture in memory. Pressing any key during the viewing returns you to the filename prompt.

After selecting N from the display screen prompt, the picture is displayed with a small blinking cursor. Make a box around the object to be converted using the right joystick to move the cursor to the upper-right corner of the box you are going to make. Press the joystick firebutton until a click is heard. Now, as the joystick is moved, a box will stretch across the screen. Move the cursor so that you have made the box big enough to fit the entire object, but not too much larger, because processing time during conversion will increase. When your object is enclosed, press the button again. You are now prompted for the filename to be used for the generated file. Be sure to include an extension of `.BAS` when saving, otherwise the computer will assign `.DAT`.

In a few minutes (the bigger the box, the longer it takes), the computer will finish its save of the reconstruction program. Pressing any key at this point ends the program.

Be sure to keep a disk in the drive while *Graphics Generator* is being used!

(Please direct questions about this program to the author at 5203 Wheeler Road, Oxon Hill, MD 20745, 301-894-6969. Please enclose an SASE for a reply when writing.) ☐

Allen Snook lives in Oxon Hill, Maryland, and has been a CoCo enthusiast for nearly four years. He enjoys graphics, sound and Simulation programs, and he is coordinator of a users group.

180	90
400	125
660	254
END	228

The listing: GRAPHGEN

```
10 CLEAR2000
20 PCLEAR8
30 FORZ=0TO6:Z(Z)=INT(2^Z):NEXTZ
40 'INITIALIZE [30-90]
50 T$="%%%%%%%%%%%%%%%%%%%%%%%%%
       %   PRINTER  GRAPHICS   %
       %   PROGRAM GENERATOR   %
       %                       %
       %          BY           %
       %     ALLEN  SNOOK      %
       %%%%%%%%%%%%%%%%%%%%%%%%%
"
60 CLS:PRINT"   ";T$
```

```
70 PRINT@416,"":PRINT@416,"FILEN
AME/EXT:";:LINEINPUTF$:IF F$<>""
 AND F$<>"D" THENLOADM""+F$
80 IF F$="D" THEN 630
90 PRINT@416,"DISPLAY SCREEN? (Y
/N)"
100 EXEC44539:IFINKEY$="Y"THENPM
ODE4,1:SCREEN1,1:EXEC44539:GOTO7
0
110 FORX=1TO4:PCOPYX TO X+4:NEXT
X
120 'GET BOX    [100-210]
130 PMODE4,1:SCREEN1,1
140 A=JOYSTK(0)*4:B=JOYSTK(1)*3
150 I=PPOINT(A,B):PSET(A,B,ABS(I
-5))
160 R=PEEK(65280):IF R=254 OR R=
126 THEN SOUND200,1:GOTO180
170 PSET(A,B,I):GOTO140
180 PSET(A,B,I)
190 C=JOYSTK(0)*4:D=JOYSTK(1)*3
200 LINE(A,B)-(C,D),PSET,B
210 LINE(A,B)-(C,D),PRESET,B
220 FORX=8TO5STEP-1:PCOPYX TO X-
4:NEXTX
230 R=PEEK(65280):IF R=254 OR R=
126 THEN SOUND200,1:GOTO260
240 GOTO 190
250 'PROGRAM     [450-570]
260 GOSUB500
270 'SAVE DATA  [230-430]
280 LN=90
290 FOR Y= B TO D STEP 7
300 N=1
310 FOR X= A TO C
320 Z=-1:E=0
330 FORY2= Y TO Y+6
340 Z=Z+1
350 IF PPOINT(X,Y2)=0 THEN E=INT
(E+Z(Z))
360 NEXT Y2
370 IF LEN(C$(N))>230 THEN N=N+1
380 C$(N)=C$(N)+RIGHT$(STR$(E),L
EN(STR$(E))-1)+","
390 NEXTX
400 FORQ=1TON
410 LN=LN+10
420 C$(Q)=STR$(LN)+" DATA "+C$(Q
)
430 IF Q=N THEN C$(Q)=C$(Q)+"999
" ELSE C$(Q)=LEFT$(C$(Q),LEN(C$(
Q))-1)
440 PRINT#1,C$(Q):C$(Q)="":NEXTQ
450 NEXTY
460 C$=STR$(LN+10)+" DATA 888"
470 PRINT#1,C$
480 CLOSE#1
```

```
490 PRINT@416,"SAVE OF GRAPHIC P
ROGRAM DONE.":EXEC44539:END
500 REM I/O
510 PRINT@416,"STORE FILE AS:";:
LINEINPUTF$
520 IF F$="" THEN 510
530 PRINT@416,"PROCESSING ";F$;"
, WAIT":PRINT@448,""
540 OPEN"O",#1,F$
550 PRINT#1,"10 PRINT#-2,CHR$(18
)"
560 PRINT#1,"20 READN:IF N=888 T
HEN 90"
570 PRINT#1,"30 IF N=999 THEN 80
"
580 PRINT#1,"40 PRINT#-2,CHR$(12
8+N);:GOTO20"
590 PRINT#1,"80 PRINT#-2:GOTO20"
600 PRINT#1,"90 PRINT#-2,CHR$(30
)
610 PRINT#1,"95 END"
620 RETURN
630 'LIST DIRECTORY
640 DIM NA$(50)
650 GOSUB730
660 FORX=1 TO N STEP 22:CLS
670 FORX2=X TO X+21
680 PRINTNA$(X2),
690 NEXT X2
700 PRINT@416,"DIRECTORY:PRESS A
NY KEY":EXEC44539
710 NEXTX
720 RUN
730 'DIRECTORY READ
740 N=1
750 FORA=3 TO 11
760 DSKI$ 0,17,A,A$(0),A$(1)
770 FORJ=0 TO 1
780 FORI=0 TO 96 STEP 32
790 EN$=MID$(A$(J),I+1,32)
800 IF ASC(MID$(EN$,1,1))=0 THEN
 840
810 IF ASC(MID$(EN$,1,1))=255 TH
EN 850
820 NA$(N)=LEFT$(EN$,8)+"/"+MID$
(EN$,9,3)
830 N=N+1
840 NEXT I,J,A
850 N=N-1
860 FORX=N TO 1 STEP -1
870 FORY=1 TO X-1
880 IF NA$(Y)>NA$(Y+1) THEN B$=N
A$(Y):NA$(Y)=NA$(Y+1):NA$(Y+1)=B
$:F=1
890 NEXTY
900 IF F<>0 THEN F=0:NEXTX
910 RETURN
```

WISHING WELL

32K
ECB

Graphics, Education and Speech Come Together

By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget that this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

This month's "Wishing Well" brings us back to some fairly advanced programming techniques. It also marks the start of a new series of programs much like our Life Skills series. (Don't worry, there will still be more in that series. Thanks to all of you who have written about that series, like second grade teacher Alice Shirley of Natrona Heights, Pennsylvania.)

This series is called Knowing Your Body and will combine some of the advanced BASIC graphics we have explored in these pages with an added bonus of synthesized speech with Radio Shack's Speech Pak. Since recent requests have centered on all three of these fields (graphics, education and speech), we will try to cover all three with this newest program and concept. Forgive me, then, if this column is a little shorter than usual. When you see the length of the listing, you will understand why.

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

The Inspiration

I don't know how many of you feel about the numerous graphics Adventure games that have been available for the CoCo over the last few years, but I have been extremely impressed with them. I am not a big Adventure fan, but I do feel that having highly detailed graphics accompany an Adventure game is really what computer games should be about. What is usually very nice about these games is that the picture just explodes onto the screen without the user having to sit through the drawing process.

Sometimes, watching the drawing process can be fun, especially if it is in the context of something like *Baseball Fever*, *Football Fever* or *Rockfest*, typed in by the user (which have appeared in previous "Wishing Well" pages). However, I have seen some BASIC graphics Adventures that are absolutely a pain to sit through while the screen creates the graphics. Somehow, the whole effect and purpose of the graphics are destroyed if you see them constructed. For this reason, all of the machine language graphics games have constructed their graphics out of the user's view.

The same applies to graphics used in an educational program. Some programmers have drawn a pumping heart for science instruction, but the drawing process really detracted from the simulation. Right now I'm working on one such simulation that I hope will knock your socks off.

For the time being, however, we will concentrate on this program. It combines some of the graphics effects used in graphics Adventures with a talking educational bent to it.

The Program

The first program in the series is *How Your Blood Works*. Unlike other graphics programs that use the artifact colors in PMODE4, this program uses the same techniques, only in PMODE2. If you check the listing, you will find the poke commands that allow you to get these colors in the combined PMODE2/PMODE1.

There are several reasons I chose this method. I, for one, do not believe there is much difference between the graphics resolution of these two modes. Since we are actually using the PMODE3 memory map when we get the artifact colors in PMODE4, each pixel of color is two pixels, forming a rectangular dot. PMODE2/1 will use four pixels for one color dot, but the dot will be a square, not a rectangle. For my money, I feel you can get better graphics using squares than rectangles.

The second reason for using PMODE2/1 is it uses half as much memory as PMODE4/3. This allows us to PCLEAR8 and have extra graphics pages hidden out of sight to do our drawing on. The third reason is these lower resolution graphics modes are twice as fast as PMODE4/3. Since we are operating in BASIC, every drop of speed helps.

Next, I had to construct a new graphics character set, since our text characters are useless in this type of program. To accommodate the lower resolution of PMODE2/1, these new graphics characters will occupy only 21 characters per line. This is no problem, however, since it is more helpful for educational purposes to have larger text. This is the type of program you might want to use with a group rather than an individual. All of our text is in uppercase lettering. We

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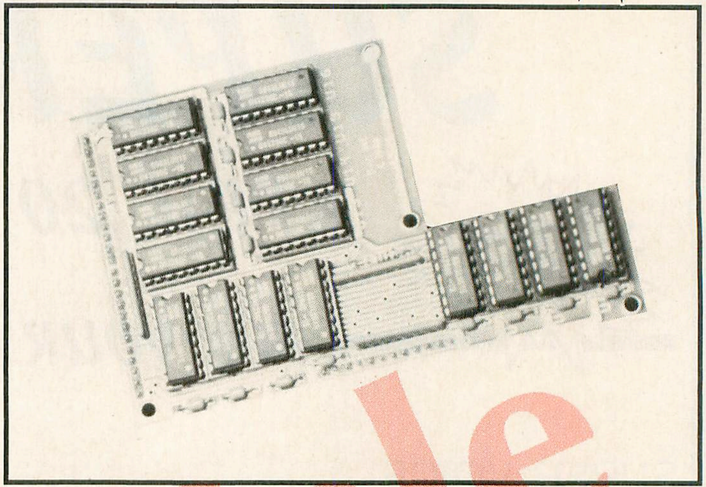

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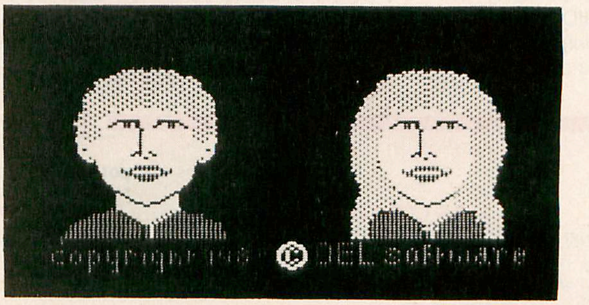

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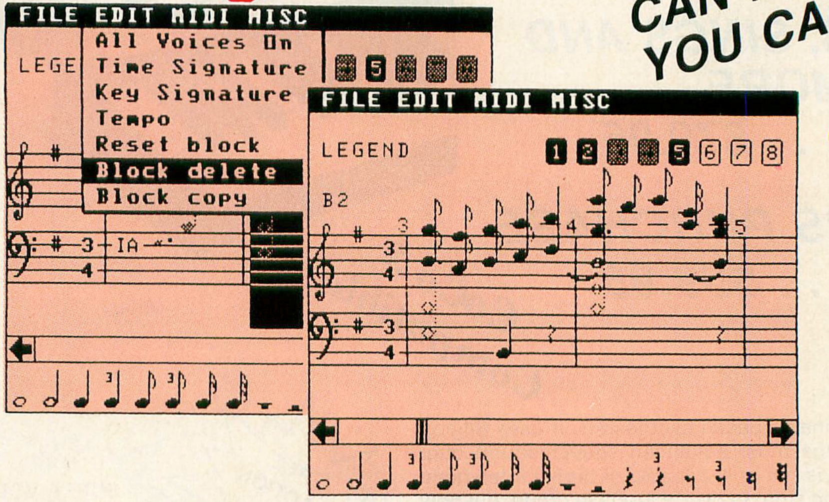

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- Compose with up to 8 completely independent voices.
- Room for over 18,000 notes. (This is not a misprint!)
- Super Simple Editing Supports:
  - Note insert
  - Note delete
  - Note change
  - Block insert
  - Block delete
  - Block copy
- Output music to:
  - TV Speaker
  - STEREO PAK
  - SYMPHONY 12
  - MIDI Synth
  - Monitor Speaker
  - ORCHESTRA 90
  - COCO MIDI S/E
  - MIDI Drum Machine
- Output up to 4 voices without additional hardware.
- Output all 8 voices using either SYMPHONY 12 or one or more MIDI synthesizers and drum machines.
- Output any voice on any of the 8 MIDI channels.
- Transpose music to any key.
- Modify music to any tempo.
- Automatically inserts bar for each measure as you compose.
- Key signature lets you specify sharps and flats only once, LYRA will do the rest.
- Plays MUSICA 2 files using LYRA CONVERT (#LC164).
- Each voice may be visually highlighted or erased.
- Each measure is numbered for easy reading.
- Solo capability
- Block edits are highlighted.
- Tie notes together for musical continuity.
- Name of note pointed to is constantly displayed.
- Jump to any point in the score instantaneously.
- Memory remaining clearly displayed, however you will have plenty of memory even for the most demanding piece.
- Help menu makes manual virtually unnecessary.
- LYRA is 100% software, no need for extra hardware unless you want more power.
- Music easily saved to tape or disk.
- Requires 64K and mouse or joystick.

LYRA (Disk only) #LY122 . . . . **$54.95**

Super Sale

LYRA OPTIONS

These LYRA options are **not** required. They are provided for those wishing additional flexibility.

LYRA CONVERT

A program to convert MUSICA 2 files to LYRA files.
(Disk) #LC164 . . . . **$14.95**

VERSION UPDATE

To receive the latest version of LYRA return your original disk. #UP162 . . . . **$10.00**

LYRA MIDI CABLE

A cable to connect your computer to your MIDI synthesizer.
#MC158 . . . . **$19.95**

LYRA SYMPHONY 12 ENHANCER

Lets LYRA play all 8 voices through SYMPHONY 12.
(Disk) #LS177 . . . . **$19.95**

LYRA LIBRARY

A collection of 50 songs ready to play for hours. Most have 7 and 8 voices. #LL137 . **$39.95**

SYMPHONY 12

A real hardware music synthesizer, lets LYRA play all 8 voices in stereo.
(T or D) #SY149 . . . . **$69.95**

COCO MID Seq/Editor

A professional quality MIDI interface for MIDI synthesizers.
(Disk only) #CM147 . . . . **$149.95**

MUSIC LIBRARY

A collection of over 900 songs. When used with CONVERT, it gives an incredible LYRA library. Each volume 100 songs.
(T or D) #MLXXX **$29.95**

COCO MAX is a trademark of Colorware.
ORCHESTRA 90 is a trademark of Radio Shack.

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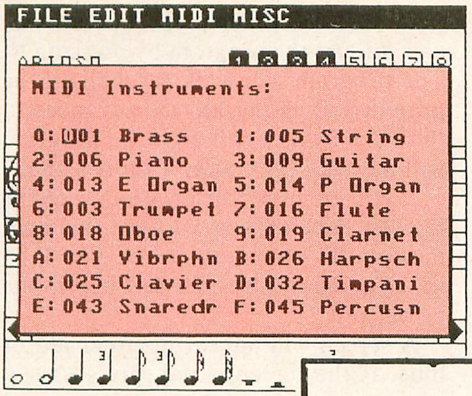


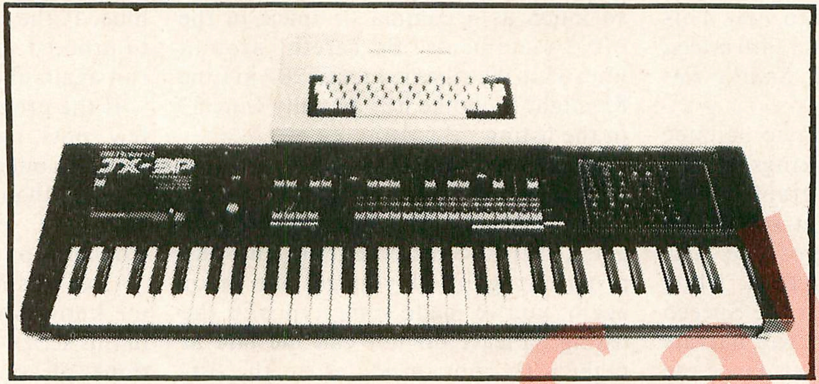
```
MIDI Instruments:

0:001 Brass    1:005 String
2:006 Piano    3:009 Guitar
4:013 E Organ  5:014 P Organ
6:003 Trumpet  7:016 Flute
8:018 Oboe     9:019 Clarnet
A:021 Vibrphn  B:026 Harpsch
C:025 Clavier  D:032 Timpani
E:043 Snaredr  F:045 Percusn
```

Introducing

COCO MIDI 2

Coco 1, 2, 3 Compatible

Lyra COMPATIBLE!



Confused about MIDI?

"Understanding MIDI"
80 pages $3.95

Now shipping version 2.4
Previous users return original disk with $20.

Super Sale

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, Yamaha, or Moog, it doesn't matter as long as it's MIDI equipped. Choose from our entry level MUSICA MIDI system that plays MUSICA files or our Professional COCO MIDI 2 system.

- Supports 16 Track recording and playback.
- Adjustable tempo.
- Over 45 Kbytes available (Over 15,500 MIDI events possible).
- Record to any track.
- Low Level track editing.
- LYRA editing. (one voice per track).
- Playback from any number of tracks.
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- Filter out MIDI data:
  - Key pressure
  - Program change
  - Pitch wheel
  - Control Change
  - Channel Pressure
  - System Message
- Graphic Piano Keyboard Display in both record and playback mode.
- Adjustable Key (Transposition) for each track.
- Save recording to disk for later playback or editing.
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- 100% machine code.
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- Metronome
- Many songs included.

Includes MIDI hardware interface, 2 MIDI cables, detailed manual, and software. Requires 64K CoCo, Y-Cable or Multi-Pak.

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DOUBLE Y-CABLE #DY181 . . . . . . **$28.95**
TRIPLE Y-CABLE #TY173 . . . . **$34.95**

DX LIBRARIAN™

Save and load voice parameters for the Yamaha DX series of synthesizers (DX-7, DX-100, DX-21 etc.). Save sounds individually or as a group letting you load the entire synthesizer in seconds. Comes with professionally developed voices for the DX-7 worth 10 times the price. Requires COCO MIDI hardware interface.

DX LIBRARIAN (Disk only) #DX143 . . . . $39.95

CASIO LIBRARIAN

Save and load voice parameters for any Casio synthesizer (CZ-101, CZ-1000, CZ-5000 etc.) You can save from the: presets, cartridge, memory or buffer. Requires COCO MIDI hardware interface.

CASIO LIBRARIAN (Disk only) #CL169 . . . . **$39.95**

MUSICA MIDI™

MUSICA MIDI takes any MUSICA 2 music file and plays it through your MIDI synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using MUSICA 2. Inlcudes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.

MUSICA MIDI Complete (Disk Only) #CM126 . . . . . . **$39.95**

MIDI KEYBOARD

If you own the Casio CZ-101 or similar MIDI synth, you know that the mini keys and the short 3 or 4 octave keyboard is limiting. MIDI KEYBOARD when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.

MIDI KEYBOARD (Disk only) #MK167 . . . . **$29.95**

only had to design 26 characters plus a period and comma.

The text is generated to the screen using several lines with `MID$`, `LEFT$`, `RIGHT$` and the `ASC` command. Other programs I have written have scrolled the text onto the screen; this program draws the text on graphics pages 6 and 7 and then will `PCOPY` them to pages 1 and 2 as we view them. The same will happen with any graphics we draw. They will be drawn off the screen, and later we will `PCOPY` them into view. This is the technique we used in *Advanced Star*Trench Warfare* and *Snail's Revenge*, to name a few.

The program takes basic science information on the workings of the human blood and gives a graphic illustration of what you might see if you used a high powered microscope. The user can view red blood cells, white blood cells and platelets. If the Speech Pak is used, the computer will narrate the story along with the text. Once the program is started, the user need only sit back and watch. One of the best graphics is watching the white blood cell attack and destroy a harmful invader. (Who knows, maybe I could use graphics like these to make an action Adventure game based on the movie *Fantastic Voyage*!)

The material in this program is material I use with my science students. However, I did refer to Funk and Wagnall's *New Encyclopedia of Science* just to be sure my facts were accurate.

Using the Program

As always, type in the listing exactly as you see it, being careful not to miss so much as a comma or space in the `DATA` statements. Be careful around lines 85 to 90, since the text `1987` in Line 85 might look like it is actually Line 87 in the listing.

Some older CoCos may require you to run the program twice before the `PCLEAR8` command takes effect. If you get a quick Syntax Error, run the program again. If you get the error again, you've made some typos in the listing. (Please do not call me late at night with your questions on the listings. Some people on the West Coast have called me after midnight, not remembering the time difference!)

When you run the program, the screen will ask if you want (T)alking or (N)ot. Those without the Speech Pak can still use the program by pressing N. The program will walk through all the graphics. Pressing ENTER advances to the next frame, although the program will advance itself after a short while.

If you are using the program with the Speech Pak, be sure you put the pack in with the power *off* before you load in the program. Never insert it with the power on!

A screen will appear in either red or blue. If the screen is red, press ENTER to proceed. If it is blue, press reset and run again until the screen turns red.

If the program seems to hesitate in a few spots, remember: It is drawing the graphics out of view, and some are more detailed than others.

Conclusion

Give this new program a try and let me know what other ideas we can try in this series. (No sex education suggestions, please.) If time permits, I might get a simple graphics Adventure put together in this fashion. Just keep those ideas coming. ☐

50	237
120	82
230	173
295	29
350	161
390	217
430	193
465	104
505	223
565	191
END	252

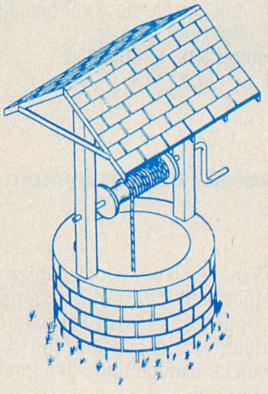
The listing: `BLOOD`

```
0 GOTO600
1 REM ************************
2 REM *  KNOWING YOUR BODY   *
3 REM * HOW YOUR BLOOD WORKS *
4 REM * A GRAPHIC SIMULATION *
5 REM *   BY FRED B.SCERBO   *
6 REM *    60 HARDING AVE.   *
7 REM * NORTH ADAMS,MA 01247 *
8 REM *  COPYRIGHT (C) 1987  *
9 REM ************************
10 CLEAR1000:CLS0:PRINTSTRING$(3
2,172);
15 FORI=1TO288:READA:PRINTCHR$(A
+128);:NEXT
20 PRINTSTRING$(32,163);
25 DATA,93,81,94,,93,91,84,94,85
,92,92,90,93,80,85,,85,88,92,94,
88,84,95,82,93,88,94,92,92,93,,
30 DATA85,93,82,,85,84,91,90,85,
,,90,,90,90,90,90,,,90,,,90,93,8
7,,90,,83,83,,
35 DATA87,,93,82,87,,87,91,85,83
,83,90,,85,,85,,,83,91,82,81,90,
81,95,82,91,83,83,86,80,80
40 DATA18,,18,19,19,18,18,,17,17
,19,19,19,,115,115,115,115,,113,
115,115,115,113,115,115,114,113,
,113,,
45 DATA26,,26,26,,26,26,,21,21,,
,21,,117,,,117,,117,,,117,117,,,
117,117,,117,,
50 DATA26,,26,26,,26,26,,21,21,1
6,,21,,117,,,117,,117,,,117,117,
,,117,117,112,117,,
55 DATA20,22,16,26,,26,26,,21,21
,28,29,28,,117,124,124,124,125,1
17,,,117,117,,,117,,121,120,,
60 DATA,26,,26,,26,26,,21,21,,20
,26,,117,,,,117,117,,,117,117,,,
117,,117,,,
65 DATA,26,,27,19,26,27,19,23,21
,,,29,32,119,115,115,115,119,117
,115,115,119,117,115,115,118,,11
7,,
70 PRINT@389," HOW YOUR BLOOD WO
RKS ";:PRINT@421," (T)ALKING OR
(N)OT ? ";
75 PRINT@453,"   BY FRED B.SCERB
O   ";
```

```
80 PRINT@485,"  COPYRIGHT (C) 19
87  ";
85 X$=INKEY$:IFX$="T"THEN105
90 IFX$="N"THEN100
95 GOTO85
100 NT=1
105 CLS0
110 XX=&HFF00:YY=&HFF7E
115 POKEXX+1,52:POKEXX+3,63
120 POKEXX+35,60
125 PMODE4,1:PCLS1:PMODE4,5:PCLS
1
130 DIMR(23),L$(26),Y(40):C$(1)=
"C1":C$(2)="C2":C$(3)="C3":C$(4)
="C4"
135 FORI=1TO26:READL$(I):NEXT
140 GOTO270
145 AA$=JK$
150 A$=STR$(A):B$=STR$(B)
155 DRAW"BM"+A$+","+B$+C$(CL)
160 IF LEN(JK$)<=21THEN180
165 FOR T=21TO0STEP-1:IF MID$(JK
$,T,1)=" "THEN175
170 NEXT T:GOTO180
175 L$=LEFT$(JK$,T):W$=L$:GOSUB1
85:JK$=" "+RIGHT$(JK$,(LEN(JK$))
-T):GOTO150
180 W$=JK$:B=B+14:GOSUB185:RETUR
N
185 SL=LEN(W$):FORI=1TOSL:BB$=MI
D$(W$,I,1):C=ASC(BB$)-64:IF C=-3
2THEN DRAW"BR12":GOTO205
190 IF C=-18THENDRAW"BR2RBR9":GO
TO205
195 IFC=-20THENDRAW"BR2R2D2G2E4B
R7":GOTO205
200 DRAWL$(C)
205 NEXTI:B=B+14:RETURN
210 IFNT=1THEN250
215 FORII=1TOLEN(AA$)
220 IF PEEK(YY)AND 128=0 THEN220
225 POKEYY,ASC(MID$(AA$,II,1))
230 NEXTII
235 IFPEEK(YY)AND128=0THEN235
240 POKEYY,13
245 FORHH=1TO600:NEXTHH:RETURN
250 FORHH=1TO3000
255 X$=INKEY$:IFX$=CHR$(13)THEN2
65
260 NEXTHH
265 RETURN
270 PMODE2,1:PCLS1:SCREEN1,1:PMO
DE1:SCREEN1,1:PCLS0:POKE65314,24
8
275 PCLS3:A=0:B=56:CL=4:JK$=" PR
ESS RESET AND RUN IF SCREEN IS B
LUE.":GOSUB145:B=B+20:JK$=" PRES
S ENTER WHEN THE SCREEN IS RED."
:GOSUB145
280 X$=INKEY$:IFX$<>CHR$(13)THEN
280
285 PCLS0:R=3:BL=2
290 PMODE2,6:PMODE1,6:COLOR2,3:L
INE(0,0)-(256,48),PRESET,BF:A=0:
B=14:CL=4:JK$=" HUMAN BLOOD PLAY
S A VERY BIG ROLE IN YOUR DAILY
LIFE.":GOSUB145:PCOPY6TO1:GOSUB2
10
295 COLOR2,3:LINE(0,54)-(256,92)
,PSET,B:B=70:A=0:CL=1:JK$=" IT I
S MUCH MORE THAN JUST A LIQUID."
:GOSUB145:PCOPY6TO1:GOSUB210
300 COLOR2,3:LINE(0,98)-(256,180
),PSET,BF:B=114:A=0:CL=1:JK$=" I
T IS ACTUALLY MADE UP OF MILLION
S AND MILLIONS OF INDIVIDUAL LIV
E CELLS.":GOSUB145:PCOPY7TO2:GOS
UB210
305 PMODE2,3:PMODE1,3::PCLS4
310 FORI=2TO252STEP4:PSET(I,0,R)
:PSET(I+2,2,R):NEXTI:GET(0,0)-(2
56,2),Y,G:FORI=4TO96STEP4:PUT(0,
I)-(256,I+2),Y,PSET:NEXTI
315 PCOPY3TO5
320 PCOPY3TO6:PMODE2,6:PMODE1,6:
PCLS4:LINE(0,108)-(256,180),PRES
ET,B:A=0:B=126:CL=2:JK$=" THE LI
QUID PART OF THE BLOOD IS A YELL
OW COLORED FLUID CALLED PLASMA."
:GOSUB145:PCOPY3TO1:PCOPY7TO2
325 GOSUB210
330 PCOPY5TO6:LINE(8,10)-(246,70
),PSET,BF:A=0:B=24:CL=4:JK$=" PL
ASMA CONSISTS OF WATER, PROTEINS
, SUGAR, SALTS AND OTHER SUBSTAN
CES.":GOSUB145:PCOPY6TO1
335 GOSUB210
340 GOSUB345:PCOPY8TO3:GOTO365
345 PCOPY5TO3:PMODE2,3:PMODE1,3:
FORI=1TO10+TH
350 A=(RND(70)*3)+15:B=RND(66)+1
0:CIRCLE(A,B),26,BL,.6:PAINT(A,B
),BL,BL:CIRCLE(A,B),26,R,.6:PAIN
T(A,B),R,R:CIRCLE(A,B),12,1,.6,.
8,.4
355 CIRCLE(A,B),26,1,.6
360 NEXT:PCOPY3TO6:PCOPY3TO4:RET
URN
365 PCOPY8TO7:PMODE2,6:PMODE1,6:
LINE(0,108)-(256,164),PRESET,B:A
=0:B=126:CL=3:JK$=" FLOATING IN
THE PLASMA ARE MILLIONS OF RED B
LOOD CELLS.":GOSUB145:PCOPY6TO1:
PCOPY7TO2:PCOPY8TO7
370 GOSUB210:GOSUB345
375 PCOPY8TO7
```

```
380 COLOR3,2:PMODE2,6:PMODE1,6:L
INE(0,108)-(256,164),PRESET,BF:A
=0:B=126:CL=4:JK$=" THE RED BLOO
D CELLS ARE ALSO KNOWN AS RED CO
RPUSCLES.":GOSUB145:PCOPY7TO2:PC
OPY6TO1:GOSUB345:PCOPY8TO7
385 AA$=LEFT$(AA$,43)+"KOHR PUSS
ULS":GOSUB210
390 PMODE2,6:PMODE1,6:LINE(0,108
)-(256,194),PRESET,B:A=0:B=126:C
L=2:JK$=" THE COLOR OF RED CORPU
SCLES COMES FROM THE HEMOGLOBIN
IN EACH CELL WHICH CARRIES OXYGE
N.":GOSUB145:PCOPY6TO1:PCOPY7TO2
:GOSUB345:PCOPY8TO7
395 AA$="THE COLOR OF RED KOHR P
USSELS COMES FROM THE HE MO GLO
BIN IN EACH CELL WHICH CARRIES O
XYGEN":GOSUB210
400 PMODE2,6:PMODE1,6:LINE(0,108
)-(256,184),PRESET,BF:A=0:B=126:
CL=3:JK$=" RED BLOOD CELLS ONLY
LAST FOR ABOUT ONE HUNDRED AND T
WENTY DAYS.":GOSUB145:PCOPY6TO1:
PCOPY7TO2:GOSUB345:PCOPY8TO7:GOS
UB210
405 GOSUB410:GOTO425
410 PMODE2,6:PMODE1,6:X=2:GOSUB4
15:PAINT(60+WM,18),2,2:X=1:GOSUB
415:PAINT(60+WM,18),4,1:RETURN
415 PMODE2,6:PMODE1,6:CIRCLE(60+
WM,32),22,X,1.4,.56,1:DRAWC$(X)+
"BM"+STR$(80+WM)+",32F4M+1,+5F2M
+8,+3":CIRCLE(96+WM,60),20,X,.9,
.75,.4:DRAW"BM-15,+26L2H4L2M-8,+
2G4DG4L4H4L2H4U4H4L2H2L8H2U2H4U4
H2U8E4R2U2R6U2R4U2E4"
420 CIRCLE(64+WM,40),10,1:PAINT(
64+WM,40),1,1:RETURN
425 LINE(0,108)-(256,164),PRESET
,B:A=0:B=126:CL=3:JK$=" WHITE BL
OOD CELLS ARE ALSO FOUND IN OUR
BLOOD.":GOSUB145:PCOPY6TO1:PCOPY
7TO2
430 GOSUB210
435 PCOPY8TO7:GOSUB345:COLOR3,2:
PMODE2,6:PMODE1,6:WM=96:GOSUB410
:LINE(0,108)-(256,190),PRESET,BF
:A=0:B=126:CL=4:JK$=" THE WHITE
BLOOD CELLS PLAY A BIG PART IN H
ELPING FIGHT DISEASE AND INFECTI
ONS.":GOSUB145:PCOPY6TO1:PCOPY7T
O2
440 GOSUB210
445 PCOPY8TO7:A=0:B=126:CL=2:LIN
E(0,108)-(256,190),PRESET,B:JK$=
" THE WHITE BLOOD CELLS ATTACK A
ND DESTROY HARMFUL SUBSTANCES IN
 YOUR BLOOD.":GOSUB145:WM=0:GOSU
B410:PCOPY4TO1:PCOPY7TO2
450 GOSUB210
455 PMODE2,6:PMODE1,6:PCOPY8TO7:
FORWM=-22TO160STEP22:PCOPY4TO6:F
ORV=2TO14STEP4:CIRCLE(220,50),V,
BL:NEXTV:GOSUB410:PCOPY6TO1:NEXT
WM
460 PCOPY8TO7:A=0:B=126:CL=3:LIN
E(0,108)-(256,190),PRESET,B:JK$=
" THE WHITE BLOOD CELLS DESTROY
THE HARMFUL SUBSTANCE AND REMOVE
S IT FROM THE BLOOD.":GOSUB145:P
COPY4TO1:PCOPY7TO2
465 PMODE2,6:PMODE1,6:PCOPY8TO7:
PCOPY8TO6:A=0:B=14:CL=1:COLOR2,3
:LINE(0,0)-(256,62),PSET,BF:JK$=
" THE BLOOD HAS A SPECIAL MECHAN
ISM THAT HELPS IT TO REPAIR WOUN
DS.":GOSUB145:PCOPY7TO2:PCOPY6TO
1
470 AA$=LEFT$(AA$,58)+"WOONDS":G
OSUB210
475 PMODE2,6:PMODE1,6:A=0:LINE(0
,68)-(256,180),PRESET,BF:CL=4:JK
$=" THIS MECHANISM USES TINY PLA
TELETS IN THE BLOOD WHICH HELP I
T TO CLOT OR CLUMP WHEN YOU RECE
IVE A CUT OR AN OPEN WOUND.":GOS
UB145:PCOPY6TO1:PCOPY7TO2
480 AA$=LEFT$(AA$,113)+"WOOND":G
OSUB210
485 PCOPY8TO6:PCOPY4TO7:PMODE2,6
:PMODE1,6:A=0:B=16:CL=1:JK$=" TH
ESE PLATELETS ARE TINY DISKS THA
T STICK TO EACH OTHER WHEN DAMAG
E OCCURS.":GOSUB145
490 GOSUB210
495 CL=3:JK$=" EX. PLATELET":GOS
UB145:DRAW"BR10C1E8R2G8":GOSUB50
0:GOTO505
500 PMODE2,6:PMODE1,6:FORI=120TO
180STEP10:FORY=1TO3:A=RND(180)+2
0:DRAW"BM"+STR$(A)+","+STR$(I)+"
C1E8R2G8BF10F8REH2":NEXTY,I:RETU
RN
505 PCOPY6TO1:PCOPY7TO2
510 PMODE2,6:PMODE1,6:TH=20:GOSU
B345:PCOPY6TO7:PCOPY8TO6:GOSUB50
0
515 A=0:B=16:CL=2:LINE(0,0)-(256
,80),PSET,B:JK$=" WHEN BLOOD CLO
TS OR CLUMPS INTO A SMALL PLUG A
 THROMBUS IS FORMED IN THE BLOOD
 STREAM.":GOSUB145
520 PCOPY7TO2:PCOPY6TO1:GOSUB210
525 PCOPY8TO6:PCOPY8TO7:PMODE2,6
:PMODE1,6:A=0:B=16:CL=1:JK$=" IF
```

```
 A THROMBUS GOES TO THE HEART IT
 CAN CAUSE A HEART ATTACK.":GOSU
B145
530 PCOPY7TO2:PCOPY6TO1
535 GOSUB210
540 A=0:CL=2:JK$=" IF A THROMBUS
 GOES TO THE BRAIN IT CAN CAUSE
A STROKE AND BRAIN DAMAGE.":GOSU
B145
545 PCOPY7TO2:PCOPY6TO1:GOSUB210
550 A=0:CL=3:JK$=" BOTH CAN BE F
ATAL.":GOSUB145
555 PCOPY7TO2:AA$="BOTH AN BE FA
YTUL":GOSUB210:FORHH=1TO500:NEXT
HH
560 PCOPY8TO6:PCOPY8TO7
565 PMODE2,6:PMODE1,6:COLOR2,3:L
INE(0,0)-(256,82),PRESET,BF:A=0:
B=14:CL=4:JK$=" THE BLOOD WILL W
ORK TO SERVE YOUR BODY AS LONG A
S YOU WATCH AFTER YOUR HEALTH.":
GOSUB145:PCOPY6TO1:PCOPY7TO2
570 AA$=LEFT$(AA$,73)+"HELLTH":G
OSUB210
575 B=B+20:CL=1:JK$=" PRESS ENTE
R TO RETURN TO START.":GOSUB145:
PCOPY6TO1:PCOPY7TO2
580 DATA U6E2R2F2D2NL4D4BR6,U8R4
F2G2NL4F2G2NL4BR8,U8R4BD8NL4BR6,
U8R4F2D4G2NL4BR8,U8NR4D4NR4D4R4B
R6,U8NR4D4NR4D4BR10,U8R6BD4NL2D4
NL4BR6,U4NU4R6U4D8BR6
585 DATA R2U8L2R4L2D8R2BR6,NU4R4
U8L4R6BD8BR6,U8D4R2NE4F4BR6,NU8R
4BR6,U8F4E4D8BR6,U8F6NU6D2BR6,U8
R6D8NL6BR6,U8R6D4L6D4BR12,U8R6D8
NL6NH4NF2BR6
590 DATA U8R6D4L4F4BR6,R6U4L6U4R
6BD8BR6,BR4U8L4R8BD8BR6,NU8R6NU8
BR6,BU8D4F4E4U4BD8BR6,NU8R4NU6R4
NU8BR6,E8G4H4F8BR6,BU8D2F4ND2E4U
2BD8BR6,NR8E8NL8BD8BR6
595 IFINKEY$=CHR$(13)THEN RUN EL
SE595
600 PCLEAR8:RUN1
```



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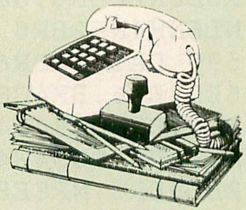

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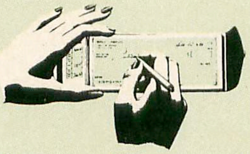

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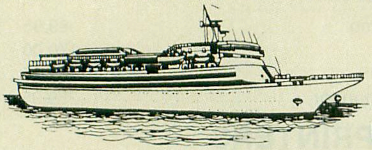

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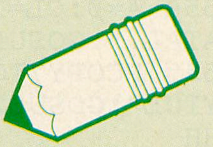

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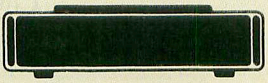

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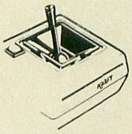

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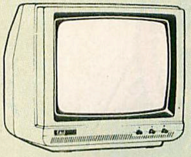

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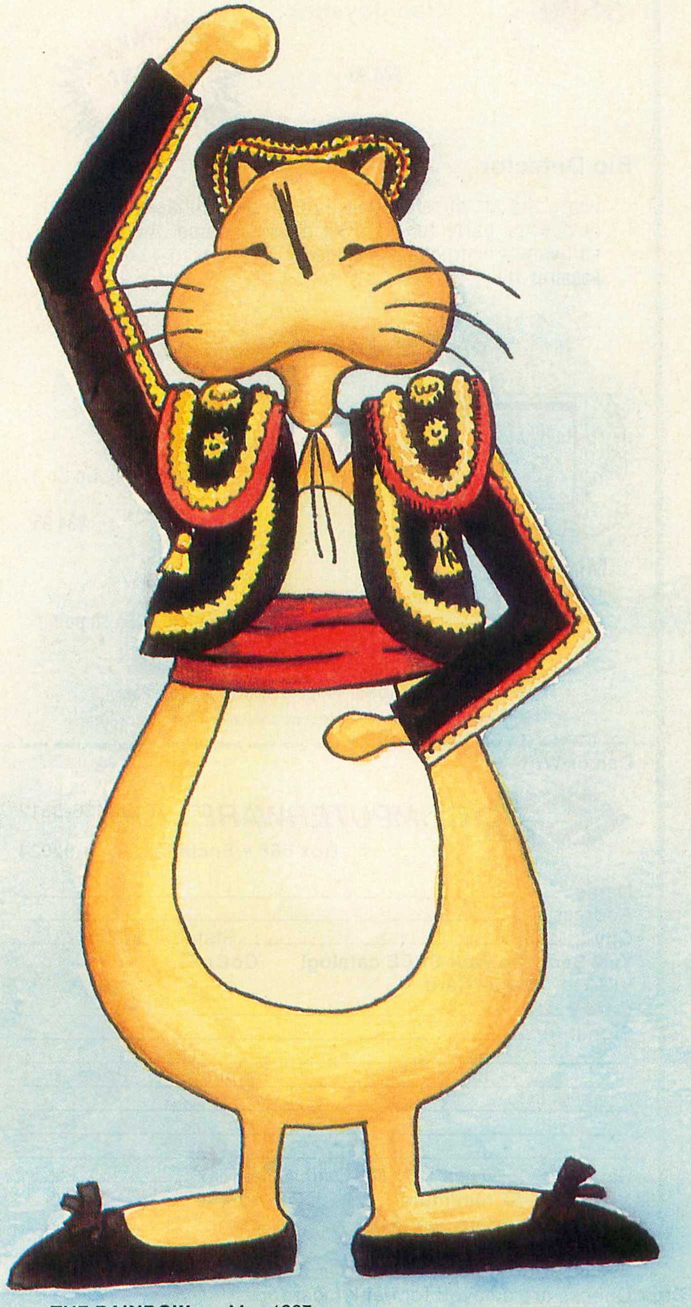


By H. Allen Curtis

CoCo Cat gains ever increasing popularity with each issue of THE RAINBOW. This lovable feline has earned a shot at an audition for his own video, and recently in Williamsburg, Virginia, CoCo Cat got his chance. CoCo Cat claimed to be a sterling hoofer (should we say a sterling pawer?) and *purr*formed a cat-dance routine that was *cat*ured on the graphics screen of the CoCo 3.

CoCo Cat's dance program is shown in Listing 1. The program not only displays CoCo Cat's graceful dancing skills, but also illustrates some of the exceptional animation capabilities of the CoCo 3. Some useful CoCo 3 discoveries have been incorporated into the program.

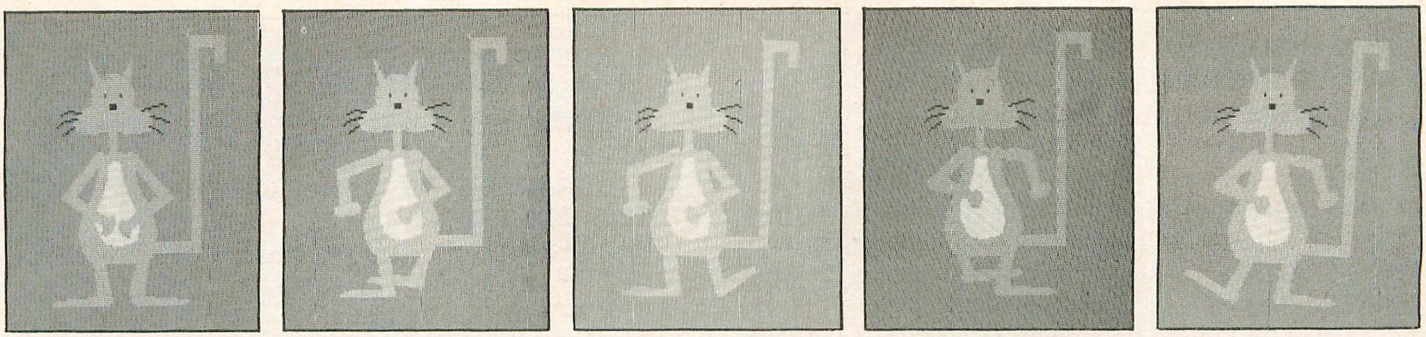
Five views of CoCo Cat's splendid figure were drawn and painted on the high resolution graphics screen. HGET commands were used to save the figures in the high resolution buffer memory. Then HPUTs were employed to animate CoCo Cat.

CoCo Cat likens the drawing and painting process to make-up application prior to the grand performance and has demanded that drawing and painting be accomplished completely behind the scenes. His demands were not easily met. The Color Computer 3 Extended BASIC manual points out that the HSCREEN command does the same types of tasks as three low resolution commands: PMODE, SCREEN and PCLS. To draw and paint behind scenes, we would like HSCREEN to set the features to be used on the high resolution graphics screen and to clear the screen, but it must not display the screen. Unfortunately, HSCREEN has not been designed to do its three tasks selectively, so we get a screen display whether we want it or not.

At CoCo Cat's insistance, we studied the HSCREEN routine and found that a

---

H. Allen Curtis lives in Williamsburg, Virginia. He is interested in 17th and 18th century history and enjoys biking through the colonial capital. He balances past and present with his computer work.



The photos above show the five sequential views used to make CoCo Cat appear to dance.

POKE&HE6B7,&H39 immediately before an HSCREEN and a POKE&HE6B7,&H20 directly after the HSCREEN will do the PMODElike and PCLSlike tasks without displaying the high resolution graphics screen. See, for example, Line 4 of Listing 1.

Our problems were not over yet. When all the drawing and painting were done, we needed to display the graphics screen, but HSCREEN clears the screen and would therefore destroy the picture of CoCo Cat in his initial dance step. With CoCo Cat acting as a *cat*alyst, we found that a POKE&HE6E4,&HE6 immediately before another HSCREEN, and a POKE&HE6E4,&HE7 just after the HSCREEN displays the screen without clearing it. CoCo Cat was *cat*egorically thrilled with our discoveries. See Line 91 of Listing 1.

The pokes following HSCREEN in lines 4 and 91 restore the HSCREEN routine to its original state. Because the BREAK key is used to terminate the program and it is possible the break could occur directly before or after one of the HSCREENs, lines 1 and 200 have been included to guarantee a restoration of the HSCREEN routine. It should be noted that I found it necessary to include an unaltered HSCREEN in Line 2. You might run the program once with that HSCREEN command deleted, to see the effect of its omission.

The part of Listing 1 concerned with drawing and painting — HCOLOR, HCIRCLE, HDRAW and HPAINT — was not programmed by any human or cat but by CoCo 3 itself. CoCo 3 did the programming via a graphics editor program we designed in anticipation of CoCo Cat's premiere showing. The graphics editor, depending on one's artistic skills, can program an infinite variety of graphics, not just cat graphics. We hope the graphics editor will appear in a future issue of THE RAINBOW.

Before closing, CoCo Cat wants me to discuss some interesting and advantageous implications involved in the ability to execute HSCREEN commands without clearing the high resolution graphics screen. This ability allows mode switching. As you will see, mode switching enhances Mode 4 operations by cutting painting time in half, by introducing textured (striped) colors, and by permitting a second, larger print.

Listing 2 starts in Mode 2 by means of HSCREEN, prints the larger characters of that mode and draws a rectangle filled with the Slot 2 color, blue. In Line 70, the mode is switched to 4. The rectangle changes to a lighter, striped blue. Lines 50 and 80 calculate how long it takes to produce the mode-switched, filled rectangle. Finally, the usual small letters of Mode 4 are printed.

Run Listing 2. When the words "the Rainbow" appear on the screen, press the BREAK key and note the paint time printed on the text screen (probably a number close to 135). To determine the time to produce a rectangle of the same size in Mode 4 alone, make the following changes: In Line 20 replace HSCREEN2 with HSCREEN4. In Line 60 replace 100 with 200 and replace the original 200 with 400. Delete Line 70. Then run the altered program. After the rectangle has been completely filled, stop the program by pressing BREAK. The paint time printed on the text screen will be approximately 261. Thus, the mode-switched, painted rectangle was generated in about half the time of the Mode 4 rectangle.

To produce solid colors in Mode 4 by means of mode switching, paint in Mode 2 with colors in slots 0, 5, 10 or 15 to produce the Mode 4 colors associated with slots 0, 1, 2 and 3, respectively.

CoCo Cat and I would be pleased to hear from you about his dance routine on the tube. Of course, CoCo Cat is a purist and refers to the tube as a *cat*hode ray tube.

(You may direct questions about this program to Mr. Curtis at 172 Dennis Drive, Williamsburg, VA 23185, 804-229-7086. Please enclose an SASE for a reply when writing.) ☐

14	154	83	241
28	133	96	150
49	74	END	187
63	65		

Listing 1: CATDANCE

```
0 'CoCo Cat Dancing
 By H. Allen Curtis
    JANUARY, 1987
1 ON BRK GOTO200
2 PALETTERGB:HSCREEN1:WIDTH40:CL
S4:LOCATE17,6:ATTR3,3,U:PRINT"CC
BS";:ATTR3,3:LOCATE6,8:PRINT"(Co
Co BroadCAsTing System)":LOCATE1
2,11:PRINT"Proudly Presents":LOC
ATE15,14:ATTR3,3:PRINT" CoCo Cat
";:LOCATE17,6:ATTR3,3
3 POKE&HFFD9,0:PALETTERGB:HCOLOR
3,0
4 POKE&HE6B7,&H39:HSCREEN1:POKE&
HE6B7,&H20
5 DIMC(15):FORI=0TO3:READC(I):PA
LETTEI,C(I):NEXT
6 DATA18,53,63,0
7 HBUFF1,462:HBUFF2,462:HBUFF3,4
62:HBUFF4,462:HBUFF5,462:HBUFF6,
903:HBUFF7,903:HBUFF8,903
```

```
8 HGET(217,145)-(303,165),5
10 HCOLOR 1
11 HDRAW"BM148,64
12 HCIRCLE(160,60),13,,1,.448,.0
51
13 HDRAW"BM172,64M+7,+2M+3,+3D4M
-1,+3M-8,+1M-14,-1M-15,+1M-5,-1M
-1,-3M+1,-3M+3,-3M+3,-2M+3,-1BM1
72,64U2
14 HPAINT(162,62),1, 1
15 HDRAW"BM166,49M+6,-9M-2,+11
16 HPAINT(168,48),1, 1
17 HDRAW"BM153,50M-6,-10M+3,+13
18 HPAINT(151,48),1, 1
19 HDRAW"BM158,77D10M-2,+2M-2,-2
L3M-3,+2M+4,+4M-3,+13M-3,+6M-5,+
10M-1,+6M+2,+9M+3,+4M+3,+2D2R6BM
162,77D10M+5,+1M+4,-1M+3,+2M-3,+
3M+2,+10M+3,+7M+6,+11M+2,+7M-1,+
7M-2,+6M-2,+2D3L6U2L19D2
20 HPAINT(154,132),1, 1
21 HCOLOR 2
22 HDRAW"BM158,94M+2,-2R3M+1,+2M
+1,+7M+3,+8M+4,+7M+1,+4M+1,+5M-1
,+6M-5,+2M-5,+1M-7,-1M-3,-3M-3,-
6U8M+4,-6M+2,-5M+2,-5U2U4
23 HPAINT(158,109),2, 2
24 HCOLOR 3
25 HDRAW"BM159,65U2R3D2L3
26 HPAINT(160,64),3, 3
27 HDRAW"BM165,58D1BM156,58D1BM1
77,66M+11,-3M+3,+1BM182,69M+6,+1
M+4,+2BM181,74M+5,+2M+2,+2BM142,
67M-6,-1M-5,+2BM140,70M-7,+1M-4,
+3BM138,74M-6,+4C1BM183,133R21U1
04M-3,-2M+2,+2M+1,-4M-1,+4R21D13
L5U8L10D104L28
28 HPAINT(189,136),1, 1
29 HGET(122,88)-(203,130),8
30 HDRAW"BM149,89M-19,+21M+24,+1
4BM156,120M-18,-11M+14,-16
31 HPAINT(149,93),1, 1
32 HDRAW"BM157,120M+3,-1M+1,+2D3
M-2,+3M-3,+2M-3,-1M+1,-3
33 HPAINT(157,122),1, 1
34 HDRAW"BM173,89M+21,+21M-24,+1
6BM167,122M+18,-13M-14,-16
35 HPAINT(173,93),1, 1
36 HDRAW"BM166,122M-1,-1M-2,+2D2
M+1,+3M+2,+1M+3,+1M+1,-2U3
37 HPAINT(170,121),1, 1
38 HDRAW"BM149,145M+1,+16M-23,+2
M-2,+2R32M+2,-2M-4,-18
39 HPAINT(154,148),1, 1
40 HDRAW"BM172,145M-3,+13M+1,+5M
+2,+1M+1,+1R27M+2,-1U1M-25,-2M+1
,-16
41 HPAINT(175,149),1, 1
42 HGET(117,145)-(203,165),1:HGE
T(122,88)-(203,130),6
43 HPUT(117,145)-(203,165),5:HPU
T(122,88)-(203,130),8
44 HDRAW"BM149,89M-24,+8M+1,+19B
M132,115M-1,-14M+21,-8BM133,115R
3M+2,+2M-1,+3M-5,+1M-6,+1M-3,-1U
2M+1,-2M+3,-1
45 HPAINT(130,116),1, 1
46 HDRAW"BM175,90M+16,+18M-22,+1
4BM166,118M+16,-11M-11,-14
47 HPAINT(174,93),1, 1
48 HDRAW"BM165,118M-3,-1M-3,+3M+
1,+3M+2,+2M+4,+2M+2,-1U2U3
49 HPAINT(164,121),1, 1
50 HDRAW"BM148,145M+3,+17L16M-6,
+1M-3,+2R32M-3,-20
51 HPAINT(153,147),1, 1
52 HDRAW"BM172,145M-5,+10M-11,-1
M-11,+1M-2,+1M-1,+1M+28,+3M+3,+1
M+2,-1U4M+3,-11
53 HPAINT(174,147),1, 1
54 HPAINT(149,156),1, 1
55 HGET(117,145)-(203,165),2:HGE
T(122,88)-(203,130),7
56 HPUT(117,145)-(203,165),5:HPU
T(122,88)-(203,130),8
57 HDRAW"BM149,89M-24,+8M+1,+19B
M132,115M-1,-14M+21,-8BM133,115R
3M+2,+2M-1,+3M-5,+1M-6,+1M-3,-1U
2M+1,-2M+3,-1
58 HPAINT(130,116),1, 1
59 HDRAW"BM175,90M+16,+18M-22,+1
4BM166,118M+16,-11M-11,-14
60 HPAINT(174,93),1, 1
61 HDRAW"BM165,118M-3,-1M-3,+3M+
1,+3M+2,+2M+4,+2M+2,-1U2U3
62 HPAINT(164,121),1, 1
63 HDRAW"BM148,145M+2,+17M-18,-1
M-8,+4R32M+2,-1M-3,-19
64 HPAINT(130,163),1, 9
65 HDRAW"BM173,145M+7,+20R2M+21,
-14M-2,-2M-6,+2M-11,+5M-1,+1M-4,
-12
66 HPAINT(177,148),1, 1
67 HGET(117,145)-(203,165),3
68 HPUT(117,145)-(203,165),5:HPU
T(122,88)-(203,130),8
69 HDRAW"BM173,89M+5,-1M+12,+1M+
4,+17M+3,-1M+2,+1M+1,+3M-1,+2M-5
,+2M-3,+1M-2,-2U2M+1,-1M-5,-15M-
14,-2
70 HPAINT(176,91),1, 1
71 HDRAW"BM149,89M-18,+15D2M+1,+
2M+22,+5D2M+2,+3R4M+2,-4M-1,-4M-
2,-1M-2,+1M-16,-7M+11,-10
72 HPAINT(149,93),1, 1
73 HPAINT(159,113),1, 1
```

```
74 HDRAW"BM172,145M-3,+18M+1,+1R
30M+3,-1M-3,-2M-23,-1M+1,-16
75 HPAINT(177,147),1, 1
76 HDRAW"BM149,144M+2,+9M-1,+2M+
2,+2M+30,-3M+2,-1M-1,-2L20M-6,+1
M-3,-7
77 HPAINT(154,149),1, 1
78 HPAINT(181,152),1, 1
79 HGET(117,145)-(203,165),4
80 HPUT(117,145)-(203,165),5:HPU
T(122,88)-(203,130),8
81 HDRAW"BM173,89M+5,-1M+12,+1M+
4,+17M+3,-1M+2,+1M+1,+3M-1,+2M-5
,+2M-3,+1M-2,-2U2M+1,-1M-5,-15M-
14,-2
82 HPAINT(176,91),1, 1
83 HDRAW"BM149,89M-18,+15D2M+1,+
2M+22,+5D2M+2,+3R4M+2,-4M-1,-4M-
2,-1M-2,+1M-16,-7M+11,-10
84 HPAINT(149,93),1, 1
85 HPAINT(159,113),1, 1
86 HDRAW"BM172,145M-3,+18M+1,+1R
30M+3,-1M-3,-2M-23,-1M+1,-16
87 HPAINT(177,147),1, 1
88 HDRAW"BM149,144M-8,+14M-17,-8
LLL5M-1,+1M+28,+14M+2,-1U4M+6,-1
5
89 HPAINT(149,151),1, 1
90 HGET(117,145)-(203,165),5:HGE
T(122,88)-(203,130),8
91 HLINE(56,8)-(280,16),PRESET,B
F:HCOLOR3:HPRINT(12,1),"CoCo Cat
 Dancing":POKE&HE6E4,&HE6:HSCREE
N1:POKE&HE6E4,&HE7
92 GOSUB94:GOTO92
93 HCOLOR1:HLINE(56,8)-(280,32),
PSET,BF
94 HPUT(117,145)-(203,165),1:HPU
T(122,88)-(203,130),6:GOSUB100
95 HPUT(117,145)-(203,165),2:HPU
T(122,88)-(203,130),7:GOSUB100
96 HPUT(117,145)-(203,165),3:GOS
UB100
97 HPUT(117,145)-(203,165),4:HPU
T(122,88)-(203,130),8:GOSUB100
98 HPUT(117,145)-(203,165),5:GOS
UB100
99 PALETTE0,RND(51):RETURN
100 FORK=0TO75:NEXT:RETURN
200 POKE&HE6B7,&H20:POKE&HE6E4,&
HE7:POKE&HFFD8,0:WIDTH32
```

Listing 2: RECTANGL

```
10 PALETTERGB
20 HSCREEN2
30 HCOLOR2
40 HPRINT(12,3),"CoCo Cat loves
50 X=TIMER
60 HLINE(100,50)-(200,120),PSET,
BF
70 POKE&HE6E4,&HE6:HSCREEN4:POKE
&HE6E4,&HE7
80 CLS:PRINT:PRINT"THE 'PAINT' T
IME WAS ";TIMER-X
90 HPRINT(32,18),"the Rainbow
100 GOTO100
```

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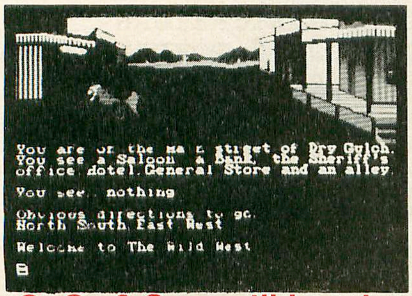

```
You are on the main street of Dry Gulch.
You see a Saloon, a Bank, the Sheriff's
office, Hotel, General Store and an alley.

You see. nothing

Obvious directions to go.
North South East West

Welcome to The Wild West
```

CoCo 3 Compatible only

NEW RELEASE

THE WILD WEST

Get out your six shooter and polish your spurs! Journey into the gunslinging land of the old west. As sheriff of Dry Gulch, your job is to keep the peace. But the notorious desperado Black Bart has escaped from jail and is on his way to Dry Gulch to recover his hidden fortune!

Can you set a trap to capture Black Bart? Or will he get you! You'll have to use every trick in the book, and be quick on the draw as well, as you talk to some unsavory characters. Decide what items you'll need to buy from the General Store, and lay a trap for your enemy!

The Wild West is designed to be played exclusively on the Tandy Color Computer 3.) It has several features not seen in most adventures.

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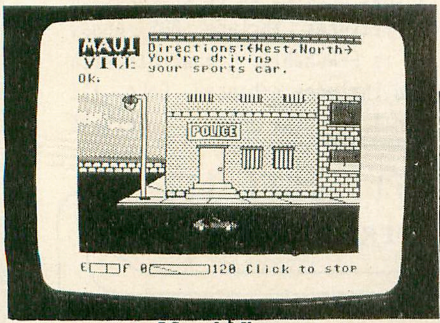


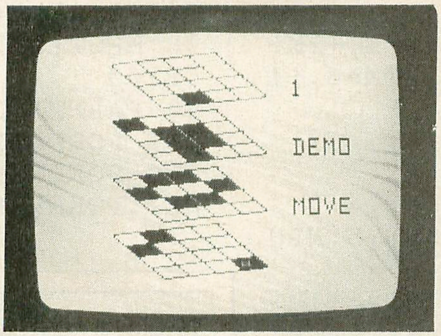
```
MAUI  Directions:<West,North>
VICE  You're driving
      your sports car.
Ok.
```

* Maui Vice

Step into the shoes of Crockett & Tubbs, and gather evidence, photographs and witnesses to convict your suspects! With "windows" to select your options, hi-res graphics, and a new story generated each time you play. This is state-of-the-art that guarantees excitement and newness every time you play.

64K Ext. Basic & Joystick Required

Disk $21.95



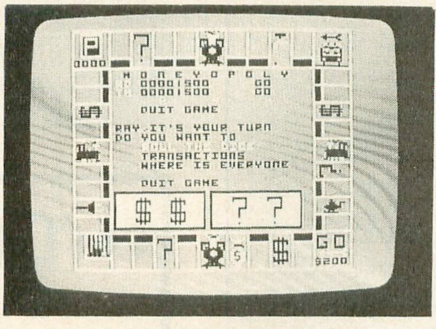
*** NEW RELEASE**

FOURCUBE

Now you can play TIC-TAC-TOE in 3D. The board consists of a 4x4x4 grid of cells. Pit your wits against the computer with six levels of difficulty or against your favorite opponent. Sound easy? Try it and you'll agree with us when we say its a "real challenge".

Requires 32K 1 or 2 Players

Tape $15.95 Disk $18.95



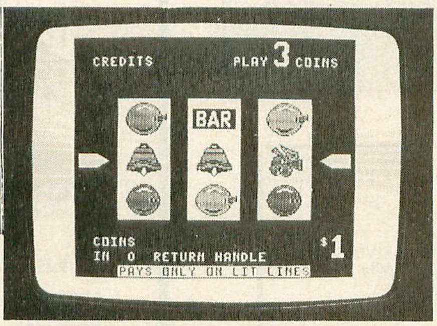
```
M O N E Y O P O L Y
  00001500      GO
  00001500      GO

  QUIT GAME

RAY.IT'S YOUR TURN
DO YOU WANT TO
  [illegible]
  TRANSACTIONS
  WHERE IS EVERYONE

  QUIT GAME
```

* Moneyopoly

Play the popular board game on one of the most realistic computer game simulations ever! Contains all the features of the original. Buy, sell, rent, wheel & deal your way to fortune.

32K Joystick Required

Tape $19.95 Disk $22.95

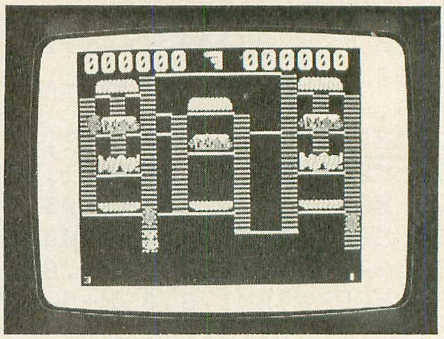


* Vegas Game Pak

Six games in all! Blackjack, Keno, Video Poker & 3 slot machine lookalikes. Super graphics!

16K Ext. Basic Required

Tape $24.95 Disk $27.95



*** NEW RELEASE**

LUNCHTIME

Your chef, Peter Pepper, is surrounded! Dodge pickles, hot dogs, and eggs while building hamburgers. This high res game features 7 difficult levels of wild entertainment. Fast paced action for either one or two players. Have a Burger Time. . .

Requires 32K & Joysticks

Tape $18.95 Disk $21.95

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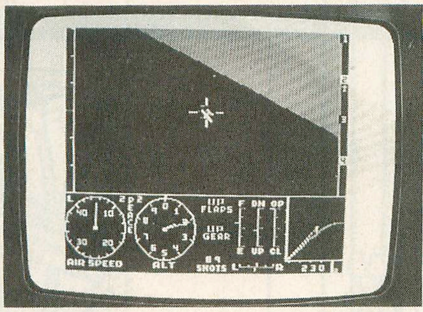

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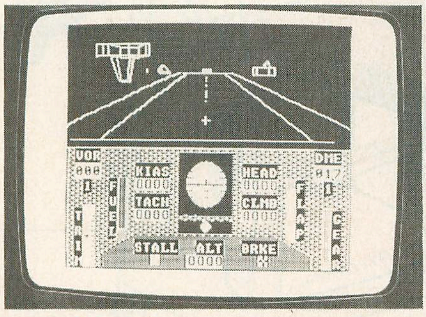

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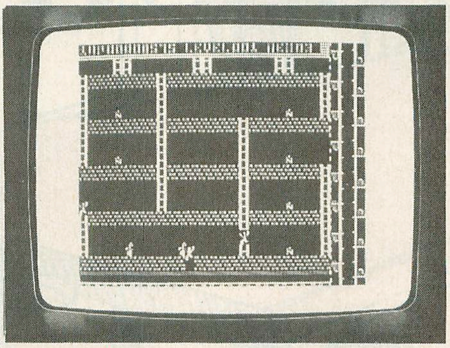

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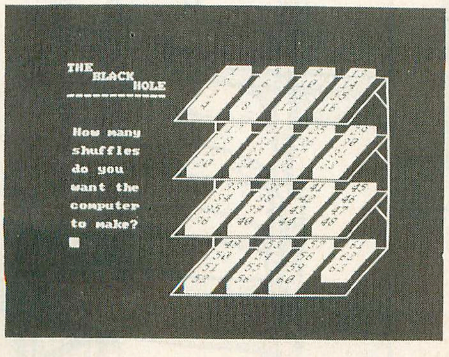

```
THE
  BLACK
      HOLE
----------

How many
shuffles
do you
want the
computer
to make?
█
```

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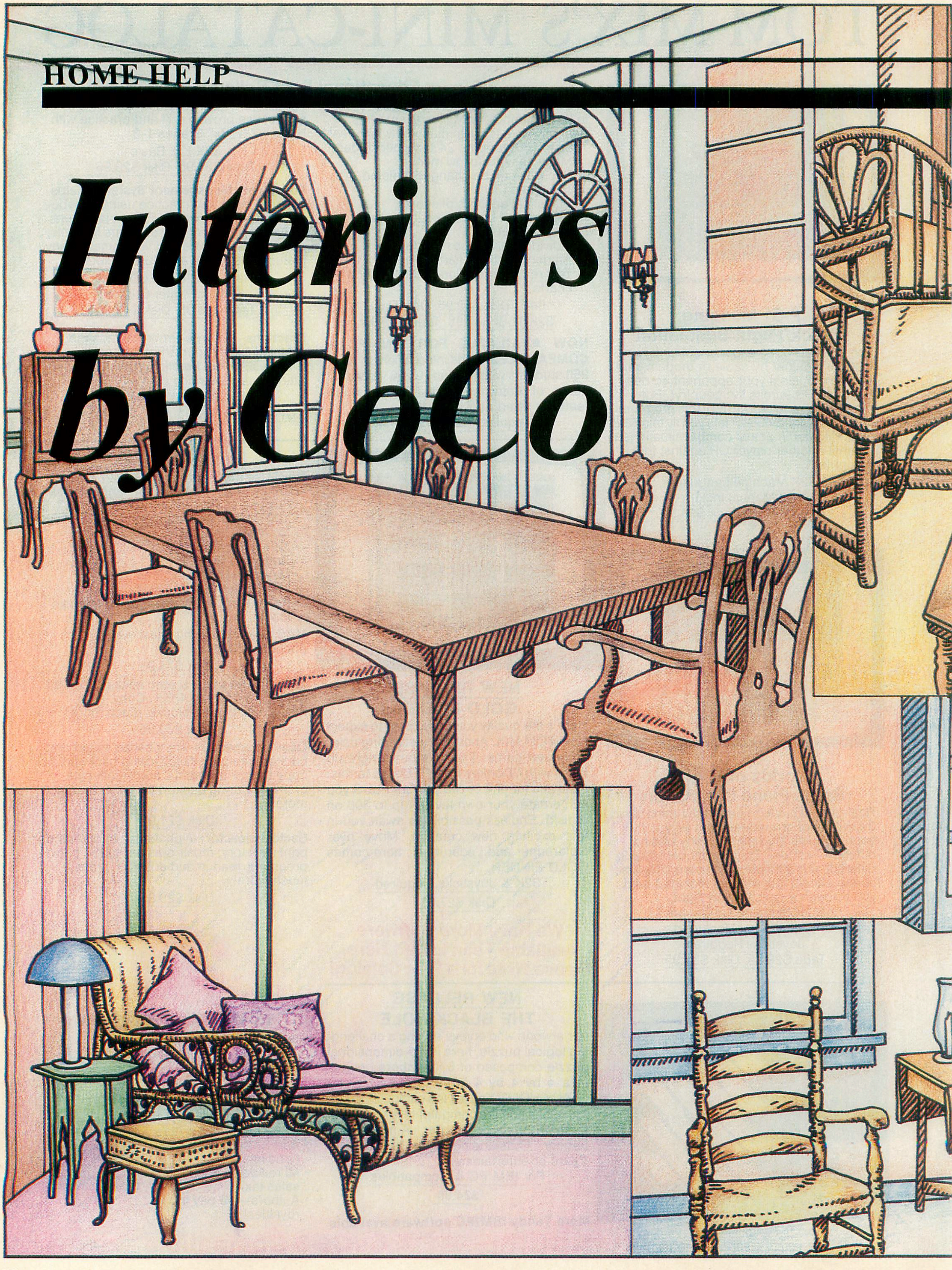
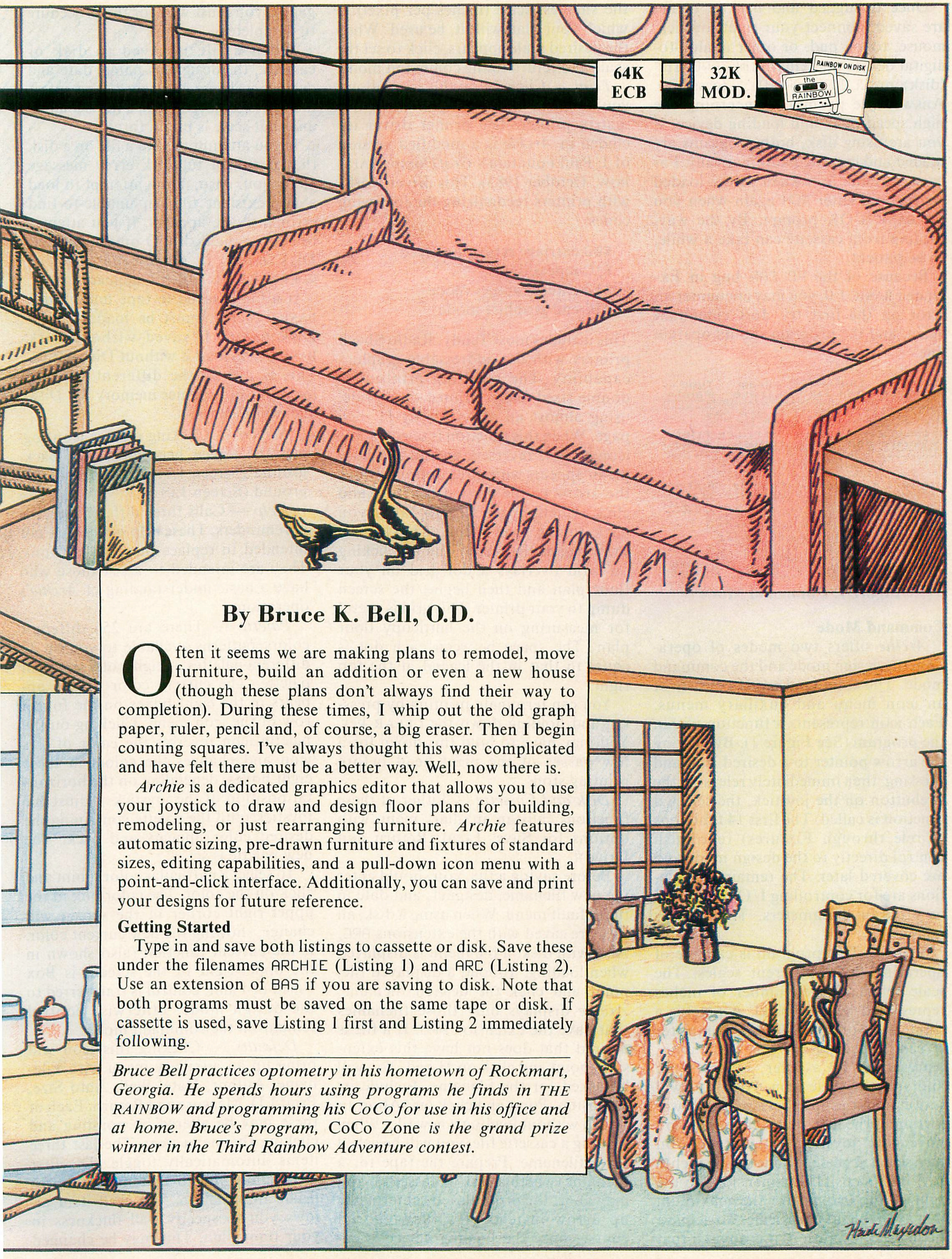


64K ECB

32K MOD.



By Bruce K. Bell, O.D.

Often it seems we are making plans to remodel, move furniture, build an addition or even a new house (though these plans don't always find their way to completion). During these times, I whip out the old graph paper, ruler, pencil and, of course, a big eraser. Then I begin counting squares. I've always thought this was complicated and have felt there must be a better way. Well, now there is.

Archie is a dedicated graphics editor that allows you to use your joystick to draw and design floor plans for building, remodeling, or just rearranging furniture. *Archie* features automatic sizing, pre-drawn furniture and fixtures of standard sizes, editing capabilities, and a pull-down icon menu with a point-and-click interface. Additionally, you can save and print your designs for future reference.

Getting Started

Type in and save both listings to cassette or disk. Save these under the filenames `ARCHIE` (Listing 1) and `ARC` (Listing 2). Use an extension of `BAS` if you are saving to disk. Note that both programs must be saved on the same tape or disk. If cassette is used, save Listing 1 first and Listing 2 immediately following.

Bruce Bell practices optometry in his hometown of Rockmart, Georgia. He spends hours using programs he finds in THE RAINBOW *and programming his CoCo for use in his office and at home. Bruce's program,* CoCo Zone *is the grand prize winner in the Third Rainbow Adventure contest.*

Once debugged and backup copies are saved, connect your right joystick, mouse, touch pad, or other analog-to-digital device and enter `RUN "ARCHIE"` (disk) or `CLOAD "ARCHIE"` (cassette). Answer the prompts concerning the high speed poke and loading device. If you are using disk, both programs are loaded and executed automatically. For cassette, enter `RUN` when you've loaded *Archie* and enter `RUN` again when you see BASIC's OK prompt. By the way, loading from cassette can take a while, so be patient.

Because of the `PCLEAR` bug in Extended BASIC 1.0, you may encounter an error on the first try. Just enter `RUN` again, and the program should operate fine.

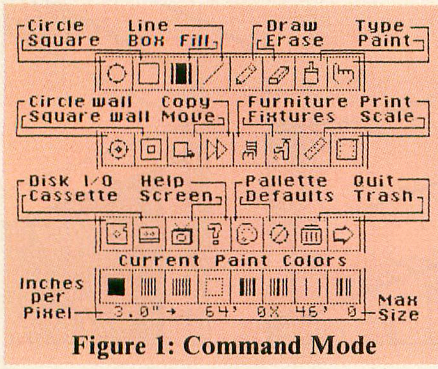


Figure 1: Command Mode

Command Mode

Archie offers two modes of operation, the design mode and the command mode. The command mode consists of an icon menu and auxiliary menus. Each icon represents a function within the program (See Figure 1). By moving the arrow pointer to a desired icon and pressing, then immediately releasing the firebutton on the joystick, the selected function is called. The first 14 functions (Circle through Fixtures) relinquish control directly to the design mode and are covered later. The remaining functions are for controlling I/O operations or program parameters. They are as follows.

Scale — This program is capable of operating at 23 different scales. The scale refers to the number of inches represented by each pixel. A pixel is a single dot on the Hi-Res computer screen. Clicking on the scale icon, represented by a ruler, reverses the colors of the scale icon. Also you will notice that the numbers in the lower portion of the icon menu change as you move your joystick horizontally. You may select a scale of one to 12 inches in ½ inch steps. The dimensions to the right of the arrow give the maximum area available at each scale. To achieve the highest resolution, it is advised that the smallest scale (inches per pixel) in which your plan will fit, be used. When the desired scale appears, click to set the scale and return to the command mode.

Print — Clicking on this icon allows you to print the floor plan to a dot matrix printer. The printer driver included in *Archie* is a modified version of J. Paul Fountain's *GrafDump* (RAINBOW, October 1983). This driver works with printers recognizing the following codes:

`$0D` carriage return-line feed
`$1C` repeat data
`$12` enter graphics mode
`$1E` end graphics mode

This includes most Tandy/Radio Shack printers with dot-addressable graphics capability. The resulting printout is double sized and is printed on its side, using almost all of an 8½-by-11 inch page. When this function is selected, the icon color is reversed, and an auxiliary menu appears with three options. Move the arrow to the desired function and click. Clicking on Return takes you back to the icon menu. Clicking on Print begins the screen dump. Clicking on Grid overlays a dot grid on your floor plan and then begins the screen dump to your printer. This grid is useful for measuring on the hardcopy floor plan. The space between each dot is equal to that in the legend at the top right.

You can terminate printing by pressing and holding down the CLEAR key. You may have to hold this down for a few passes of the print head before printing stops.

Disk and Cassette — Either of these functions calls an auxiliary menu with options for Save, Load, Return and Drive #.

Before saving a file, you should enter the new filename, designer, and date in the default menu. When using a disk, all files are saved with the extensions `ARC`. Also with disk, a file menu is displayed when loading. To load a displayed file, point and click the desired filename. *Archie* displays only those filenames that have the extension `ARC`. If a file is desired that does not have this extension, point and click on *Load. You will be asked for the filename. Include its extension. Point and click on *Abort to return without loading a new file. When loading a cassette file, you will be asked for a filename. Prepare the tape for a filename (whether disk or cassette). You may abort the procedure by entering an up arrow instead of a filename. Of course, once the loading device is engaged, you must wait for the procedure to complete.

When a file is saved to disk or cassette, the designer's name, date and current scale are also saved. This information is retrieved when a file is loaded, and that scale is put in force.

If you attempt to save a file on a disk that is full, a full-disk error message alerts you. Also, if you attempt to load a non-existent file, an unable-to-find error message appears. If you attempt to choose the disk I/O option without Disk BASIC in force, the message `WHERE'S DISK BASIC?` appears.

If a file is saved to tape under Disk BASIC, then it must be loaded under Disk BASIC. If saved without Disk BASIC, then load it without Disk BASIC. This is due to the different starting locations of graphics memory for Disk and non-disk BASIC.

Screen — Clicking on this icon toggles the screen between a buff background (Screen 1,1) and a green background (Screen 1,0).

Help — Calls three different screens of reminders. These help screens are not intended to replace these instructions. They are intended to assist those who have a basic understanding of *Archie*'s operations.

Palette — There are 256 different colors/patterns available to you on 32 different palettes — eight colors on each palette. The current color palette appears in the eight boxes on the fourth row of the icon menu. Clicking on the palette icon reverses the color of this icon and changes the colors in these eight boxes, depending on the horizontal position of the joystick. Adjust the joystick until the palette containing the desired color appears and click. The new palette is set.

To select a particular color, point and click on the color. The color box in the upper-right corner of the screen will change, showing the new current color. If the current function (also shown in the upper-right of the screen) is Box Filled or Paint, control is transferred to the design mode; otherwise control remains in the command mode.

Defaults — Clicking this icon will bring up an auxiliary menu with Filename, Author, Date, Wall, Auto Size, Print I.D, Measure and Return. Each of these may be altered by pointing and clicking the menu item. The last three items automatically toggle. The first three allow you to type in the appropriate information. The Wall item allows you to specify wall thickness in your floor plan. This may be changed as often as desired. All calculations and drawings will be based on the parameter in force at the time they are drawn. This is useful when drawing 6-inch exterior walls and 4½-inch interior walls. The Print I.D. item, when on, prints the filename, author's name, and date when two or more designs are concatenated (joined together) to make one large printout. Notice that the right side of screen is printed first, so that the right side of the second plan should be designed to match the left side of the first plan. Also notice that drawings may only be concatenated along the horizontal axis.

Realizing that both the Color Computer and RAINBOW have become international entities, a choice between U.S. and metric systems of measurement are available. Clicking on Measure toggles between the two. When in the metric system, the scale is given in centimeters (C) and the dimensions are given in meters. A conversion of 30.48 centimeters per foot is used.

Trash — This clears the current screen. This may also be accomplished by pressing SHIFT-CLEAR simultaneously in the design mode. This can be undone by pressing SHIFT and the down arrow in the design mode.

Quit — If you accidentally quit, type `CONT` and press ENTER to return to the program. Type `POKE 113,0: EXEC40999` to clear memory for a new program. I made it a bit cumbersome on purpose so that accidental data loss would be less likely.

Design Mode

The design mode allows you to work on your plan using the current function (see Figure 2). Most of the control is through joystick input, although some keyboard input is required. A small blinking dot, acting as cursor, represents the current draw position. First let's look at the 14 functions available. In each of the descriptions below, the function is invoked by pressing and holding down the firebutton while moving the joystick. Releasing the firebutton completes the maneuver.

Circle — Place the joystick where you want the center of your circle and, while pressing the firebutton, move the joystick to produce the desired radius. The radius (one-half the diameter) appears in feet and inches in the top center of the screen.

Square — Place the cursor at one outside corner of the desired position of the square and, while pressing the firebutton, move the joystick until the desired square is made. The width and height of the square are given in the size box. These dimensions are inclusive of the lines of the square.

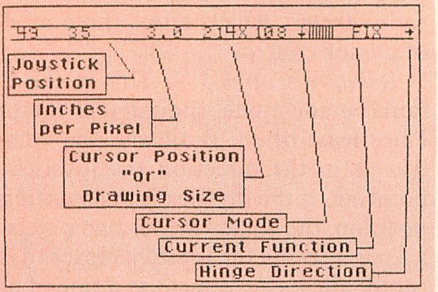


Figure 2: Design Mode

Box Filled — Works the same as Square, but produces a square filled with the current paint color.

Line — Place the cursor at the starting point of the desired line and move the joystick to position the other end of the line. The total length of the line is given at the top of the screen.

Draw — Place the cursor at the desired starting point and, while pressing the firebutton, move the joystick.

Erase — While pressing the firebutton, a blinking box erases anything in its path.

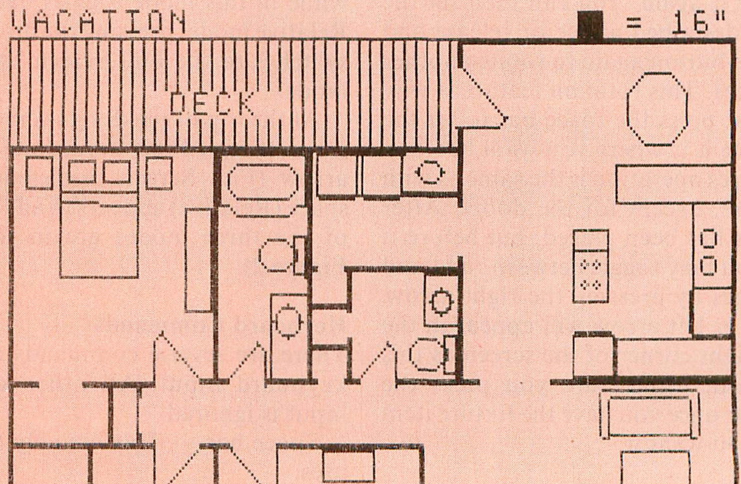
Paint — Place the cursor inside the area to be filled. Press the firebutton, and the appropriate area will be painted.

Type — Position the cursor. Click and the text cursor will appear (a bell). Type your message and press ENTER. If you are finished with your message, press CLEAR;otherwise press the space bar to continue the next line. Pressing SHIFT-0 simultaneously toggles between dark and light letters. Pressing SHIFT-@ toggles between red and blue letters. Each cursor position represents one of BASIC's `PRINT@` locations. If these do not correspond exactly to a desired location, printed text can later be moved, as described below.

Circle Wall — This draws a circular wall of the thickness specified in the default menu and functions as the Circle command. The program begins with 4½-inch walls. The dimensions given at the top of screen are "on center" width and height radii.

Square Wall — This draws a square or rectangular wall and functions as the Square command. Again, the height and width are given as "on center" dimensions. "On center" is a standard architectural designation and refers to the distance from the center of one wall to the center of the opposite wall. This measurement is usually less than the whole area covered by the thickness of one wall in each direction. Always place the cursor at the position you want the outside edge of the wall before pressing the joystick to draw.

Move — While pressing the joystick firebutton, enclose the area you want to move with the blinking square. A certain amount of memory has been reserved for storing a surrounded item for a move. In the dimension box, the remaining reserved memory is given.



Sample printout of a vacation home design.

Once the reserved memory is used, a warning sound is heard. The message `AREA TOO LARGE` appears if you attempt to enclose too great an area. Once the desired area is enclosed, release the button and move the cursor to the approximate point you want to place the acquired area. Press the button again and, while holding it down, adjust the position. The old area will be erased when the firebutton is released.

Copy — This works exactly like Move, except that the old area is not erased.

Furniture — This program is complete with pre-drawn furniture and fixtures that may be placed anywhere in your plan. Clicking on the chair icon will bring up the various furniture drawings. Move the blinking bell to the desired item, click and the design screen will appear. Clicking on Cancel returns you to the command mode.

Once back in the design mode, the familiar dot cursor can be seen on the screen. Move the cursor to the approximate area in which you will place the selected furniture item. Press and hold down the firebutton to fine-adjust its position. Then release the firebutton and press the space bar to set that item. A door bell chime will sound to remind you to press the space bar. A second chime sounds when the space bar has been pressed, to let you know the item has been set.

You may also rotate the furniture item 90 degrees by releasing the firebutton (after initially pressing it) and pressing it again. You can then set the item as described above or release and press the button again to rotate another 90 degrees. This rotation feature is why you must press the space bar to set the item once it is where you want it.

Fixtures operation is the same as with Furniture, except for the doors. After the door has been placed, but before it is set, you may toggle between right and left hinges by pressing the right arrow. A right or left arrow will appear in the upper-right corner of the screen as this is toggled. Make sure you press the space bar once you have the fixture item where you want it.

Cursor Control

One of the problems encountered in designing any joystick operated graphics editor is the fact that there are 256 by 192 available points on the screen, but only 64 by 64 divisions recognized by the joystick interface. This provides a poor resolution — much poorer than we want. This problem can be solved by hardware (e.g., CoCo Max) or software as in *Archie*, which offers three modes of cursor control.

Relative Control — This is the default cursor mode, though it is the one I use least often. Basically, the cursor travels in the direction the joystick is pointing. If the joystick is at an extreme position, the cursor moves two pixels at a time. Placing the joystick closer to the center allows movement at a rate of one pixel. Bringing the joystick still closer to center halts the cursor. The current joystick values are given at the top of the screen (see Figure 2).

Full Screen Immediate Control — This is invoked by pressing the down arrow key while in the design mode. When in this mode, the cursor can be placed anywhere on the screen immediately, by moving the joystick to its relative position. However, you will note there are some "in-between" positions you cannot achieve in this way. Once in this mode, you may press the down arrow again to toggle to the Relative mode, or you may press the up arrow to switch to the Single Pixel Immediate mode.

Single Pixel Immediate Control — Pressing the up arrow while in the design mode invokes this mode. Wherever the cursor is at the time this mode is invoked becomes the center of a 64 by 64 pixel square. The cursor can be placed at any spot within the square by moving the joystick to its relative position. This allows easy fine adjusting of position or size. Pressing the up arrow while in this mode toggles back to the Relative mode; pressing the down arrow switches to the Full Screen Immediate mode.

At the top of the design screen, an up arrow (Single Pixel Immediate), a down arrow (Full Screen Immediate), or a space (Relative) appears to advise which of the three modes are in force (see Figure 2).

Keyboard Commands

There are several commands called by keyboard input. All other keyboard input is ignored.

Space bar — This actually has three uses:

- Pressing the space bar in the design mode switches you to the command mode, bringing down the icon menu. This is the only way to call the icon menu.
- Pressing it in the command mode switches you to the design mode, leaving in force the current function. You may also point and click to call the design mode.
- You must press the space bar to set a furniture or fixture item as described above. Pressing it a second time calls the icon menu.

Arrow keys — The up and down arrows change cursor control as described. The right arrow toggles the door hinges as described.

SHIFT-down arrow — Pressed simultaneously, this erases whatever you have done to the last click. You may undo anything (including a trashed screen), but you cannot undo an undo. So be careful.

SHIFT-CLEAR — This trashes (or clears) the design screen. You may also do this from the command mode by clicking on the trash can icon.

C — This is the Continue function. You may continue a function after releasing the firebutton by pressing C. Your old drawing (up to the last click) is erased and, when you press the button again, a new drawing appears from the initial starting point to the new cursor position. This is especially useful when changing cursor modes. For example, you may draw a large square in the Full Screen mode. Then release the firebutton, press C, press up arrow to invoke the Single Pixel mode, and then press the firebutton to fine-adjust the original large square. Continue may be used only while drawing with Square, Circle, Box Filled, Line, Circle Wall, Square Wall, Copy and Move.

R — The Recall feature allows you to display the dimensions of the last figure drawn. The dimensions appear at the top of the screen momentarily and are then replaced by the current cursor position. Note, however, after returning from the command mode, pressing R recalls the maximum dimensions allowed at the current scale.

P — This is a special Recall with Print. After the most recent dimensions are replaced by the cursor position (as described above), move the cursor to the approximate place you would like to print these dimensions on your plan and, while pressing the firebutton, fine adjust. Then release the firebutton.

32K Modification

Archie may be easily modified to operate on a 32K CoCo with Extended Color BASIC. On a disk system, the help screens must be sacrificed as well as the maximum area size that may be Moved or Copied at a time. Otherwise operation is identical. The modification for 32K is as follows:

Listing 1

In lines 5 and 100, change 64K to 32K.
Line 5: Change 31409 to 29209.
Line 180: Change 31410 to 29209.
Change 31449 to 29239.
Change Line 185 to read:

```
185 DATA 34,37,30,8D,0,19,
10,9E,BC,31,A9,C,A0,C6,15,
31,36,A6,A2,A7,80,5A,2C,F9,
10,9C,BC,2E,F0,35,B7
```

Delete Line 190.
Line 225: Change to `EXEC29209`
Change Line 230 to:

```
230 POKE29227,&H80:POKE
29229,&HA2
```

Listing 2

In lines 5 and 160, change 400 to 200 (disk only).
Line 225: Change 31410 to 29209.
Change Line 365 to read: `365 REM` (disk only).
Delete lines 370 to 395 (disk only).

Typing the Listings

A few special characters are used in the listings that may need clarification. To generate '^', use up arrow; for [, use SHIFT-down arrow; for], use SHIFT-right arrow; the – is made with SHIFT-up arrow; and the \ with SHIFT-CLEAR.

Also, if you are not operating a disk system, you will be typing in many commands that normal Extended Color BASIC will not recognize. When you `LIST` or `LLIST` the program, you will see an '?' instead of the command. Don't worry, however; the program is designed to prevent you from executing any disk commands if Disk BASIC is not present.

The Hi-Res Character Set

Archie uses a machine language generated, high resolution character set that may be used as a stand-alone ML program. To accomplish this, delete lines 0 to 35 and lines 80 to 245 of Listing 1. Type `CLEAR 200,31878` and run the program. When the OK prompt returns, save by entering `(C)SAVEM "CHARACTR",31879,32767,31879.` Or if you want to run the routine from BASIC, then add these lines:

```
35 CLEAR200,31878
80 EXEC31879
85 PMODE4,1: SCREEN1,1
```

This Hi-Res character set also allows for screen scroll and screen clears with the CLEAR key or `CLS` command. In fact, you may `CLS` to one of nine colors with standard BASIC commands. Pressing SHIFT-@ simultaneously toggles between red and blue letters. You may use this with any BASIC program except those that use pokes to video memory (1024-1535), those that use the same memory as the program and, in some cases, those that use graphics memory. It is written in *position-independent* code and may be offset loaded. Permission is granted to use the routine in your programs as long as proper credit is given.

Archie is an extensive, dedicated graphics editor. Virtually all you need to create floor plans is available. However, it is not designed to replace the services of a qualified architect. Before constructing any design, a professional should be consulted to assure structural soundness and compliance with local building codes. Also, like any program of this nature, some practice is required before its operation is mastered. I encourage you to experiment with *Archie* and make it work for you.

(You may direct questions to the author at 614 East Elm Street, Rockmart, GA 30153. Please enclose an SASE for a reply when writing.) ☐

40	163
53	102
64	33
73	187
125	44
170	213
205	109
END	185

Listing 1: ARCHIE

```
0 'ARCHIE 1.1, (loader), (C) 198
6,87 BRUCE BELL, THIS PROGRAM IS
 MADE AVAILABLE 'AS IS' AND IS N
ON-WARRANTED.
5 CLS:PRINT"ARCHIE 1.1",,"(C) 19
86,87 BRUCE BELL","64K EXTENDED
COLOR BASIC",,,:CLEAR1000,31409:
PCLEAR8:DIMA(17)
10 INPUT"WILL YOU USE THE 'HI-SP
EED POKE'";Q$:Q=INSTR(1,Q$,"N"):
POKE492,Q:IFQ>1THEN10
15 IFPEEK(49152)<>68THENQ$="C"EL
SEINPUT"WILL THE PROGRAM BE LOAD
ED FROM cASSETTE OR dISK";Q$:IFQ
$<"C"ORQ$>"D"THEN15
20 POKE65495-Q,0:POKE253,PEEK(18
8):POKE254,0:'253 & 254 point to
 start of graph mem for hires ch
aracters in ARCHIE.
25 PMODE4,5:PCLS5:DRAW"BM6,105C0
U50M+25,+50L25BM0,110U80M+40,+80
L40":POKE178,2:PAINT(2,108),,0
30 DRAW"BM72,60C0U4E50U6R3D6F50D
4H2U2H48L3G48D2G2":FORK=0TO2:CIR
CLE(124,15+K),20,0,.7,0,.5:NEXT
35 CIRCLE(255,90),40,0:CIRCLE(25
5,90),30,0,1,.32,.69:DRAW"BM245,
62D56":POKE178,1:PAINT(250,90),,
0:SCREEN1,1
40 FORK=31879TO32767:READD$:POKE
K,VAL("&H"+D$):NEXT:'poke hi-res
 alpha routine
45 DATABE,1,68,AF,8D,0,AA,B6,1,6
7,A7,8D,0,A2,BE,1,6B,AF,8D,0,7D,
B6,1,6A,A7,8D,0,75,BE,1
46 DATAA1,AF,8D,0,3F,B6,1,A0,A7,
8D,0,37,30,8D,0,7E,BF,1,68,30,8D
,0,58,BF,1,6B,30,8D,0,18
47 DATABF,1,A1,86,7E,B7,1,67,B7,
1,6A,B7,1,A0,86,39,A7,8C,B1,39,0
,0,0,0,34,13,AE,63,8C,A3
48 DATAA9,26,2,8D,5,35,13,0,0,0,
4D,26,2,86,31,80,3A,2C,FA,8B,A,3
0,8D,0,11,30,86,A6,84,9E
49 DATABC,30,89,18,0,A7,82,9C,BC
,26,FA,39,0,FF,18,AA,55,99,24,FE
,DB,D,6F,27,3,0,0,0,34,37
50 DATA81,C,26,2,8D,CB,81,13,26,
2,3,FF,86,5C,A7,8C,AB,8D,10,16,0
,A8,D,6F,27,3,0,0,0,34
```

```
51 DATA37,8D,2,20,6A,1F,2,DC,88,
C4,E0,E7,8C,8E,86,C,3D,DB,89,E0,
8C,86,D3,BC,C3,0,0,9E,88,8C
52 DATA5,0,25,3,C3,C,0,1E,2,81,D
,26,12,8D,18,31,A9,FE,81,1F,20,C
5,1F,26,F4,31,A9,1,7F,20
53 DATA7B,81,8,26,6,A7,8D,FF,59,
86,20,30,8D,0,7A,81,5F,2F,6,A7,8
D,FF,4A,80,20,8D,62,80,20,27
54 DATA5,30,8,4A,26,FB,C6,8,A6,8
0,8D,40,26,FA,8D,4F,6F,8D,FF,2F,
39,6D,8D,FF,2B,26,2B,9E,BC,30
55 DATA89,17,FF,AF,8D,FF,1F,31,A
8,E0,10,AC,8D,FF,17,2D,17,31,89,
E8,B8,EC,A1,ED,A9,FE,7E,10,AC,8D
56 DATAFF,6,23,F3,31,89,FE,81,8D
,8B,6F,8D,FE,FA,35,B7,6D,8D,FE,F
3,27,1,43,D,FF,27,1,47,A7,A4
57 DATA31,A8,20,5A,39,34,7,C6,2,
86,FF,8D,E5,26,FA,35,87,FF,FF,FF
,FF,FF,FF,FF,FF,EF,EF,EF,EF,EF
58 DATAFF,EF,FF,AF,AF,AF,FF,FF,F
F,FF,FF,EB,EB,C9,FF,C9,EB,EB,FF,
EF,C3,BF,C7,FB,87,EF,FF,9B,9B,F7
59 DATAEF,DF,B3,B3,FF,E7,DB,DB,E
7,DA,DD,E2,FF,CF,CF,EF,DF,FF,FF,
FF,FF,E7,DF,BF,BF,BF,DF,E7,FF,9F
60 DATAEF,F7,F7,F7,EF,9F,FF,FF,E
F,C7,83,C7,EF,FF,FF,FF,EF,EF,83,
EF,EF,FF,FF,FF,FF,FF,FF,9F,9F,DF
61 DATABF,FF,FF,FF,83,FF,FF,FF,F
F,FF,FF,FF,FF,FF,CF,CF,FF,FD,FD,
FB,F7,EF,DF,DF,FF,C7,BB,B3,AB,9B
62 DATABB,C7,FF,EF,CF,EF,EF,EF,E
F,83,FF,C7,BB,FB,E7,DF,BF,83,FF,
C7,BB,FB,E7,FB,BB,C7,FF,BB,BB,BB
63 DATA81,FB,FB,FB,FF,83,BF,87,F
B,FB,BB,C7,FF,C7,BF,BF,87,BB,BB,
C7,FF,83,FB,F7,EF,DF,BF,BF,FF,C7
64 DATABB,BB,C7,BB,BB,C7,FF,C7,B
B,BB,C3,FB,FB,C7,FF,FF,FF,CF,CF,
FF,CF,CF,FF,FF,CF,CF,FF,CF,CF,EF
65 DATADF,F7,EF,DF,BF,DF,EF,F7,F
F,FF,FF,83,FF,83,FF,FF,FF,BF,DF,
EF,F7,EF,DF,BF,FF,C7,BB,FB,E7,EF
66 DATAFF,EF,FF,FF,FF,FD,FB,F7,A
F,DF,FF,EF,D7,BB,83,BB,BB,BB,FF,
87,BB,BB,87,BB,BB,87,FF,C7,BB,BF
67 DATABF,BF,BB,C7,FF,87,BB,BB,B
B,BB,BB,87,FF,83,BF,BF,87,BF,BF,
83,FF,83,BF,BF,87,BF,BF,BF,FF,C3
68 DATABF,BF,B3,BB,BB,C3,FF,BB,B
B,BB,83,BB,BB,BB,FF,83,EF,EF,EF,
EF,EF,83,FF,FB,FB,FB,FB,FB,BB,C7
69 DATAFF,BB,B7,AF,9F,AF,B7,BB,F
F,BF,BF,BF,BF,BF,BF,83,FF,BB,93,
AB,BB,BB,BB,BB,FF,BB,9B,AB,B3,BB
70 DATABB,BB,FF,C7,BB,BB,BB,BB,B
B,C7,FF,87,BB,BB,87,BF,BF,BF,FF,
C7,BB,BB,BB,AB,B7,CB,FF,87,BB,BB
71 DATA87,AF,B7,BB,FF,C7,BB,BF,C
7,FB,BB,C7,FF,83,EF,EF,EF,EF,EF,
EF,FF,BB,BB,BB,BB,BB,BB,C7,FF,BB
72 DATABB,BB,BB,BB,D7,EF,FF,BB,B
B,BB,BB,AB,93,BB,FF,BB,BB,D7,EF,
D7,BB,BB,FF,BB,BB,D7,EF,EF,EF,EF
73 DATAFF,83,FB,F7,EF,DF,BF,83,F
F,EF,EF,EF,EF,83,C7,EF,FF,EF,C7,
83,83,83,1,DF,FF,FF,F7,F3,81,F3
74 DATAF7,FF,FF,EF,C7,83,EF,EF,E
F,EF,FF,FF,EF,CF,81,CF,EF,FF,FF
80 POKE32104,57:POKE32244,57:FOR
K=1TO4:READD:POKED,253:NEXT:'mod
ify hires char routine for ARCHI
E
85 DATA 31999,32007,32082,32177
95 EXEC31879:POKE253,PEEK(253)+2
4:PRINT@202,"A R C H I E";:GET(8
1,72)-(165,79),A,G:FORK=-1TO1:PU
T(81+K,72+ABS(K))-(165+K,79+ABS(
K)),A,AND:NEXT
100 SCREEN1,1:PRINT@258,"ARCHITE
CTURAL FLOOR PLANNER":PRINT@323,
"FOR THE 64K COLOR COMPUTER";:PR
INT@393,"BY BRUCE BELL":PRINT@45
8,"VERSION 1.1":PRINT@492,"\ \ \
 \":POKE253,PEEK(253)-24
105 FORK=31462TO31878:READD$:POK
EK,VAL("&H"+D$):NEXT:'poke scree
n dump (modified from RBOW 10.83
, GRAFDUMP by J. PAUL FOUNTAIN)
110 DATA86,FF,A7,8C,FA,6F,8C,F5,
86,80,A7,8C,ED,6F,8C,E8,86,1,A7,
8C,E9,86,FE,97,6F,86,12,AD,9F,A0
115 DATA2,9E,BA,30,88,1F,AF,8C,C
D,30,89,17,E0,AF,8C,C8,10,8E,0,1
,8D,76,AE,8C,BD,17,0,94,17,1
120 DATA1E,17,0,A1,30,88,20,AC,8
C,B0,2F,EF,86,D,AD,9F,A0,2,8D,5A
,AE,8C,A1,9C,BA,2D,66,8D,75,17
125 DATA1,3E,17,0,82,30,88,20,AC
,8C,91,2F,F0,86,D,AD,9F,A0,2,AE,
8C,84,9C,BA,2D,51,34,20,AD,9F
130 DATAA0,0,81,C,35,20,27,45,31
,21,10,8C,0,8,2F,C,10,8E,0,1,6C,
8D,FF,65,6C,8D,FF,63,AE,8D
135 DATAFF,5C,30,1F,AF,8D,FF,56,
AE,8D,FF,54,30,1F,AF,8D,FF,4E,20
,88,86,1C,AD,9F,A0,2,86,2F,AD,9F
140 DATAA0,2,86,80,AD,9F,A0,2,39
,86,81,A7,8D,FF,3C,20,92,86,1E,A
D,9F,A0,2,F,6F,39,1F,20,E7,8D
145 DATAFF,25,EC,84,6A,8D,FF,1F,
27,4,59,49,20,F6,39,88,FF,8A,80,
A4,8D,FF,16,A7,8D,FF,E,6C,8D,FF
150 DATA7,A1,8D,FF,5,26,F,E6,8D,
```

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```
FE,FD,C1,80,27,7,AC,8D,FE,F3,2C,
1,39,E6,8D,FE,EE,5D,27,40,86
155 DATA1C,AD,9F,A0,2,A6,8D,FE,E
1,34,2,AB,E0,AD,9F,A0,2,A6,8D,FE
,D7,AD,9F,A0,2,6F,8D,FE,CD,AC
160 DATA8D,FE,C7,2D,13,A6,8D,FE,
C6,AD,9F,A0,2,AD,9F,A0,2,86,80,A
7,8D,FE,B7,39,A6,8D,FE,B3,A7,8D
165 DATAFE,AE,39,A6,8D,FE,A9,AD,
9F,A0,2,AD,9F,A0,2,20,D0,A7,8D,F
E,9D,A4,8D,FE,9B,E6,8D,FE,97,3D
170 DATA68,8D,FE,92,1F,98,58,34,
4,AB,E0,AB,8D,FE,86,A7,8D,FE,82,
A6,8D,FE,7F,81,8,2F,11,6F,8D,FE
175 DATA77,6C,8D,FE,73,A6,8D,FE,
6E,6F,8D,FE,6A,39,A6,8D,FE,64,20
,C1,44,44,44,8D,BC,44,39
180 FORK=31410TO31449:READD$:POK
EK,VAL("&H"+D$):NEXT:'poke icon
menu mover
185 DATA34,37,8E,80,1,10,9E,BC,3
1,A9,C,A0,C6,15,31,36,A6,A2,1A,5
0,7F,FF,DF,A7,80,7F,FF,DE,1C,AF
190 DATA5A,2C,EF,10,9C,BC,2E,E6,
35,B7
195 PMODE4,1:PCLS5:PMODE3,1:FORY
=2TO74STEP24:DRAW"BM8,=Y;":FORI=
1TO8:DRAW"C6R20D20L20U20BR20":NE
XTI,Y:PMODE4,1:CIRCLE(18,12),6,0
:CIRCLE(18,36),6,0:CIRCLE(18,36)
,2,0:CIRCLE(118,60),6,0:DRAW"BM1
14,64C0E8"
200 POKE178,250:LINE(52,18)-(64,
6),PSET,BF:DRAW"BM32,18C0U12R12D
12L12 BR40E12 BR17NG9F3G2NH3G7NH
3L3NU3 BR20U3E7R5ND3G7NL5D3NE7L5
 BR21EU8R3U4R2D4R3D2NL8D6GL8 BR2
2H3U8ERFD3ND2R3ND2R3ND2R2FD4G3 B
M32,42U12R12D12L12BE4U4R4D4L4"
205 DRAW"BR16BD2U8R8D5ND3R2F2NL4
DL2NDL4NDL4NDL2 BR20BD2U12F6NG6U
6F6G6U6 BR16BD6U4R3ND2R3ND4E2L6N
G2U4NUR6NUD2NL6D6 BR11BDEFGHBU3U
2ER4EU2RU2NL2RNR2D2RD10L3U5L3DL2
 BR21BD4
210 DRAW"E10H3G3NFG2NFG2NFG3F3 B
R17U11ER12GD11L12BE2U0BU3U0BU3U0
BU3U0BR8D0BD3D0BD3D0BD3D0 BM12,6
6U12R12D2L2D2R2D8L12BE4BR2H2E2F2
G2 BR14BD3NR12U2NR12U6ER10FD8BH5
EFGHBL4EFGH"
215 DRAW"BR17BD6U8NER6NH4NE4R5ND
8ENL11D8GL11BE3U2ER3FD2GL3H BR19
BU6U2ER6FD2G2D3BD2D2L3U2R3BU2L3U
3E1U2LDL2 BR17BD7NF2U7E3R5F4D4G2
L2G2L4BEBU2EFGHBU4U0BE2BLU0BR3U0
BF2U0"
220 DRAW"BR40D5BL3U5BL3D5BG2R10E
U8NL12H2L4NUL4G2D8F BR19BU2U6ER5
UEND2F5G5NUGU2L6ER5"
225 EXEC31410
230 FORK=31426TO31439:READD$:POK
EK,VAL("&H"+D$):NEXT:DATA 1A,50,
7F,FF,DF,A6,80,7F,FF,DE,1C,AF,A7
,A2:'poke icon put
235 FORK=5TO8:PCOPYK TOK-4:NEXT:
SCREEN1,1:PRINT@0,"";:POKE65494,
0
245 IFQ$="C"THENCLOAD"ARC"ELSELO
AD"ARC.BAS",R
```

40	111	375	80
85	73	405	140
145	175	450	79
175	167	475	142
215	15	525	232
260	105	550	41
310	184	640	243
340	157	END	172

Listing 2: ARC

```
0 'ARCHIE 1.1 (main module), (C)
 1986 BRUCE BELL, THIS PROGRAM I
S MADE AVAILABLE 'AS IS' AND IS
NON-WARRANTED.
5 DIMA(2),B(400),N$(22):DEF FND(
S)=INT(WW*S/12-.5):DEF FNJ(H)=(A
BS(H)-1)*SGN(H)
10 D$(0)="ARCHIE   ":D$(1)="B. BE
LL ":D$(2)="02/10/87":M$="CIRCLE
SQUAREBOXFILLINE  DRAW  ERASE PA
INT TYPE  CIRWALSQRWALMOVE  COPY
  FURN  FIX   SCALE PRINT DISK
CASSETSCREENHELP  PALETEDEFALTTR
ASH END    "
15 SP$=" ^[":U$=" ###X### ":ME$=
CHR$(34):S=4:SS=3:M=2:PC=1:CP=0:
PP=10:SC=1:WW=4.5:PQ=PEEK(492):G
=PEEK(188)*256:G1=PEEK(253):G2=G
1+24
20 PMODE4,5:PCLS5:PMODE4,1:PCLS5
:DRAW"BM50,50C0U6F6L3M+2,+4LM-2,
-4L2":PAINT(52,48),0,0:GET(50,44
)-(56,54),A,G:PCLS5:SCREEN1,1
25 POKE65495-PQ,0
30 POKE178,PC:LINE(192,0)-(204,7
),PSET,BF:PRINT@26,MID$(M$,1+6*(
M-1),6);:PRINT@23,MID$(SP$,SP+1,
1);:COLOR5,0
35 POKE255,255:PRINT@9,USING"##.
#"+ME$;SS;:POKE255,0:XM=0:YM=8:G
OSUB200:PSET(X,Y,C):IFQ$=""THEN6
```

"INCREDIBLE"
Software/Hardware patch to run CoCo Max II on a CoCo III
Req 26-3024 Multi-Pak Interface
$29.95

GREAT CoCo III Products!

• SECRETS REVEALED

An introduction to the Color Computer III that compares the differences between the CoCo I/II and the NEW CoCo III. Includes: GIME chip specs, CoCo II to CoCo III converter, CoCo III memory map and a 128K/512K RAM test. "Offers some very good information to programmers." - Rainbow Review Feb '87 $19.95

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```
5ELSEIFQ$="\"THENC=5:GOTO330ELSE
IFQ$="["THENC=5:GOTO60ELSEIFQ$="
 "THENC=5:GOSUB235:GOTO295
40 IFQ$<>"R"ANDQ$<>"P"THEN50ELSE
GOSUB285:FORT=1TO999:NEXT:IFQ$="
P"THENGET(80,0)-(184,7),B,G:GOSU
B235:GOSUB200:Z=1ELSE50
45 GOSUB230:PUT(X1,Y1)-(X1+104,Y
1+7),B,AND:GOSUB200:IFZ=2THENZ=0
:GOTO35ELSE45
50 IFQ$="^"THENSP=(SP+1)AND1:X3=
X1:Y3=Y1:GOTO30ELSEIFQ$=CHR$(10)
THENSP=(SP+2)AND2:GOTO30ELSEIFQ$
="C"THENCN=1:GOSUB230
55 GOTO35
60 GOSUB230:GOTO30
65 GOSUB235:ONM GOTO70,90,90,90,
115,125,135,140,70,90,155,155,18
0,180
70 IFCN=0THENX=X1:Y=Y1 ELSECN=0:
X=X2:Y=Y2
75 X2=X:Y2=Y:YM=8:Z=1:POKE253,G2
:D=FND(S)
80 W=ABS(X-X1):IFW=0GOSUB200:GOT
O80ELSEHW=ABS(Y-Y1)/W:CIRCLE(X,Y
),W,0,HW:IFM=9ANDW>=D THENCIRCLE
(X,Y),W-D,0,HW
85 GOSUB265:GOSUB200:IFZ=2THENZ=
0:POKE253,G1:GOTO35ELSEGOSUB230:
GOTO80
90 IFCN=0THENX=X1:Y=Y1 ELSECN=0:
X=X2:Y=Y2
95 X2=X:Y2=Y:YM=8:Z=1:POKE253,G2
:D=FND(S)
100 IFM=4THENLINE(X,Y)-(X1,Y1),P
RESET ELSE IFM=3THENPOKE178,PC:L
INE(X,Y)-(X1,Y1),PSET,BF ELSE LI
NE(X,Y)-(X1,Y1),PRESET,B
105 IFM=10ANDD>0THENDX=SGN(X1-X)
*D:DY=SGN(Y1-Y)*D:LINE(X+DX,Y+DY
)-(X1-DX,Y1-DY),PRESET,B
110 GOSUB265:GOSUB200:IFZ=2THENZ
=0:POKE253,G1:C=PPOINT(X,Y):GOTO
35ELSEGOSUB230:GOTO100
115 YM=8:Z=1
120 X=X1:Y=Y1:PRESET(X,Y):PRINT@
10,USINGU$;X,Y:GOSUB200:IFZ=2THE
NZ=0:GOTO35ELSE120
125 XM=2:YM=10:Z=1:COLOR0,5
130 GOSUB200:LINE(X1-2,Y1-2)-(X1
+2,Y1+2),PSET,BF:PRINT@10,USINGU
$;X1,Y1:LINE(X1-2,Y1-2)-(X1+2,Y1
+2),PRESET,BF:IFZ=2THENZ=0:C=PPO
INT(X,Y):GOTO35ELSE130
135 POKE178,PC:PAINT(X1,Y1),,0:C
=PPOINT(X1,Y1):POKE178,3:GOTO35
140 IFY1>180THEN30ELSEP=X1/8+Y1+
Y1/6*10
145 PRINT@0,"PRESS <ENTER> AT EN
D OF THE LINE";:PRINT@P,"";:LINE
INPUTS$:IFP>479THEN30ELSEPRINT@0
,"<CLEAR> TO QUIT:<SPACE> TO CON
T.";
150 Q$=INKEY$:IFQ$=""THEN150ELSE
IFQ$=CHR$(12)THEN30ELSEIFQ$=" "T
HENP=P+32:GOTO145
155 YM=8:Z=1:IFCN THENCN=0:X=X2:
Y=Y2:GOTO175ELSEPOKE253,G2:X=X1:
Y=Y1
160 GOSUB230:GOSUB200:IFZ=1THENP
OKE179,53:LINE(X,Y)-(X1,Y1),PRES
ET,B:X2=INT(400-(ABS(X-X1)+1)*(A
BS(Y-Y1)+1)/40):PRINT@16,X2:IFX2
<0THENPLAY"L255O1A":GOTO160ELSE1
60
165 POKE253,G1:IFX2<0THENPRINT@1
4,"AREA TOO LARGE!";:SOUND100,1:
FORT=1TO500:NEXT:Z=0:GOTO30
170 X2=X:Y2=Y:GET(X,Y)-(X1,Y1),B
,G:LINE(X,Y)-(X1,Y1),PSET,B:DX=X
1-X:DY=Y1-Y:X1=X:Y1=Y:XM=ABS((DX
-ABS(DX))/2):YM=ABS((DY-ABS(DY))
/2)+8:GOSUB200:Z=1
175 GOSUB200:GOSUB230:PUT(X1,Y1)
-(X1+DX,Y1+DY),B,AND:IFZ=1THEN17
5ELSEZ=0:IFM=11THENLINE(X2,Y2)-(
X2+DX,Y2+DY),PSET,BF:PUT(X1,Y1)-
(X1+DX,Y1+DY),B,AND:GOTO35ELSE35
180 Z=1:POKE253,G2:PRINT@31,CHR$
(95-O);:C=0
185 X=X1:Y=Y1:DRAW"BM=X;,=Y;C0S=
S;A=A;":ONW GOSUB620,625,630,635
,640,645,650,655,660,665,670,680
,685,690,695,700,705,710,715,555
,555,555,555,555,565,570,575,580
,580,585,590,595,600,605,610,610
,615,615:DRAW"S4A0"
190 PRINT@14,USINGU$;X,Y;:GOSUB2
00:IFZ<2GOSUB230:GOTO185ELSEPLAY
"O3L9GE":C=PPOINT(X,Y):GOSUB200:
IFQ$=CHR$(9)THENO=(O+2)AND2:PRIN
T@31,CHR$(95-O);:GOSUB230:GOTO18
0ELSEIFQ$=" "THENZ=0:POKE253,G1:
PLAY"L40CDEFGABO4C":GOTO30
195 IFQ$="["THENZ=0:POKE253,G1:G
OSUB230:GOTO30ELSEGOSUB230:A=(A+
1)AND3:GOTO180
200 H=JOYSTK(0):V=JOYSTK(1):PRIN
T@0,H;V:IFM=8THENH=INT(H/2):V=IN
T(V/4.3)+1:X1=H*8:Y1=V*12:GOTO21
5ELSEIFSP=2THENX1=INT(H*4.06):Y1
=INT(V*2.91)+8ELSEIFSP=1THENX1=X
3+H-32:Y1=Y3+V-32ELSEH=INT(H/9.2
)-3:H=FNJ(H):V=INT(V/9.2)-3:V=FN
J(V):X1=X1+H:Y1=Y1+V
205 IFX1<XM THENX1=XM:H=0ELSEIFX
```

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```
1>255THENX1=255:H=0
210 IFY1<YM THENY1=YM:V=0 ELSEIF
Y1>191THENY1=191:V=0
215 Q$=INKEY$:PK=PEEK(65280):IFQ
$<>""ORPK=126ORPK=254THENRETURNE
LSEIFZ=1THENZ=2:RETURN
220 PSET(X,Y,C):X=X1:Y=Y1:C=PPOI
NT(X,Y):PSET(X,Y,C+1):PRINT@14,U
SINGU$;X,Y;:GOTO200
225 PRINT@256,STRING$(21,32):EXE
C31410:DRAW"BM5,0C0R166D104L166N
U104BR4DR163U101C5RD102L164":GOS
UB240:GOSUB360:RETURN
230 FORI=5TO8:PCOPYI TOI-4:NEXT:
C=PPOINT(X,Y):RETURN
235 FORI=1TO4:PCOPYI TOI+4:NEXT:
RETURN
240 IFME THENSS=30.48/S:ME$="C"E
LSESS=12/S:ME$=CHR$(34)
245 PRINT@257,USING"##.#"+ME$+"]
";SS;:DX=256:DY=184:PP=264:GOSUB
275:PP=9:RETURN
250 PRINT@0,D$(0);:PRINTTAB(27)"
=";:PRINTUSING"###"+ME$;8*SS;:PO
KE178,0:LINE(200,0)-(208,7),PSET
,BF:RETURN
255 DRAW"BM0,9C0R90D112L90":COLO
R5:LINE(1,10)-(89,120),PSET,BF:P
OKE255,255:PRINT@33,D$(0);:POKE2
55,0:RETURN
260 H=JOYSTK(0):V=INT(JOYSTK(1)/
8):K=V*32+64:PRINT@K,"\";:PK=PEE
K(65280):IFPK=255ORPK=127THENPRI
NT@K," ";:GOTO260ELSERETURN
265 IFJ THENPRINT@14,USINGU$;X1,
Y1;:RETURNELSEIFM=4THEN280ELSEDX
=(ABS(X-X1)+1):DY=(ABS(Y-Y1)+1):
IFM<9ORM>10THEN275ELSEDX=DX-S*WW
/12:IFDX<0THENDX=0
270 DY=DY-S*WW/12:IFDY<0THENDY=0
275 DX=DX/S:DY=DY/S:IFME THENXF=
DX*.305:YF=DY*.305:GOTO290ELSEXF
=INT(DX):XI=(DX-XF)*12:YF=INT(DY
):YI=(DY-YF)*12:GOTO290
280 DX=((ABS(X-X1)+1)/S)^2:DY=((
ABS(Y-Y1)+1)/S)^2:DX=SQR(DX+DY):
XF=INT(DX):XI=(DX-XF)*12:PRINT@1
0,USING"    ###'##    ";XF,XI;
285 IFM=4THENIFME THENPRINT@10,U
SING"     ###.##    ";XF*.305+XI*.0
25:RETURNELSEPRINT@10,USING"
###'##    ";XF,XI:RETURN
290 IFME THENPRINT@PP,USING"###.
##X###.##";XF;YF;:RETURNELSEPRIN
T@PP,USING"###'##X###'##";XF,XI,
YF,YI;:RETURN
295 GOSUB225
300 GET(XX,YY)-(XX+6,YY+10),B,G:
PUT(XX,YY)-(XX+6,YY+10),A,AND:Q$
=INKEY$:IFQ$=" "THENP=M-1
305 Q$=INKEY$:IFQ$=" "THENP=M-1
310 PK=PEEK(65280):IFQ$=" "ORPK=
126ORPK=254THENPLAY"L50O4C":IFP<
12THENM=P+1:GOTO60ELSEIFP>23THEN
320ELSEPUT(XX-8,YY-15)-(XX+8,YY+
3),B,NOT:ONP-11 GOTO520,530,515,
495,405,410,400,365,355,335,330,
325
315 H=INT(JOYSTK(0)/8):V=INT(JOY
STK(1)/16)*8:P=H+V:IFP=P1 THEN30
5ELSEPUT(XX,YY)-(XX+6,YY+10),B,P
SET:XX=H*20+18:YY=V*3+18:P1=P:GO
TO300
320 PC=CP+P-24:POKE178,PC:LINE(1
92,0)-(204,7),PSET,BF:IFM=3ORM=7
THEN60ELSE315
325 POKE65494,0:SCREEN0,0:CLS8:P
RINT"you can continue by typing"
,"CONT <PRESS ENTER>",,,"or you
can cold start by typing POKE113
,0:EXEC40999 <ENTER>",,,"BYE-BYE
!":END:POKE65495-PQ,0:SCREEN1,1:
GOSUB230:GOTO295
330 PCLS5:GOTO30
335 POKE255,255:PCLS5:PRINT@0,"D
EFAULT MENU":PRINT:PRINT" FILENA
ME: "D$(0)," DESIGNER: "D$(1),"
DATE: "D$(2),," WALL:";:IFME THE
NPRINTUSING"##.## CM";WW*2.54ELS
EPRINTWW"IN"
340 PRINT" AUTO SIZE: "MID$("ON
OFF",J*3+1,3),," LPRINT I.D.: "M
ID$("YESNO ",L*3+1,3)," MEASURE:
 "MID$("U.S.  METRIC",ME*6+1,6),
" RETURN":POKE255,0
345 GOSUB260:IFV<4THENPRINT@K+20
,"";:IFV<3THENINPUTD$(V):D$(V)=L
EFT$(D$(V)+STRING$(8,32),8):GOTO
335ELSEINPUTWW:IFME THENWW=INT(W
W*39.37+.5)/100:GOTO335ELSE335
350 IFV=7THENGOSUB230:GOTO295ELS
EIFV=4THENJ=(J+1)AND1:GOTO335ELS
EIFV=5THENL=(L+1)AND1:GOTO335ELS
EME=(ME+1)AND1:GOTO335
355 CP=INT(JOYSTK(0)/2)*8:GOSUB3
60:PK=PEEK(65280):IFPK=255ORPK=1
27THEN355ELSE295
360 V=CP:FORH=13TO162STEP20:POKE
178,V:LINE(H,79)-(H+10,89),PSET,
BF:V=V+1:NEXT:RETURN
365 PCLS5:PRINT@24,"COMMAND"TAB(
57)"MODE:":PRINT@246,"_ COLORS"T
AB(54)"_ IN/PIX &"TAB(24)"MAX SI
ZE":GOSUB225:FORK=0TO23:PRINT@32
2+K*8,MID$(M$,K*6+1,6);:NEXT:DRA
W"BM9,116C0R240D74L240NU74BR4DR2
```

<<<<< COLORFUL UTILITIES >>>>>

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```
37U71":GOSUB395
370 PCLS5:PRINT@0,"KEYBOARD INPU
T:"TAB(24)"DESIGN"TAB(57)"MODE:"
TAB(32)"<SHFT>-<[>= UNDO","<SHFT
>-<CLR>= TRASH","<SPACE>= COMMAN
D MODE",,"CURSOR MODE (DEFAULT=
 RELATIVE):[= FULL SCREEN IMMEDI
ATE","^= SINGLE PIX IMMEDIATE",,
,
375 PRINT"]= TOGGLE L-R DOOR HIN
GES","<SPACE>= SET FIXTURE/FURNI
TURE",,,"R= RECALL LAST DIMENSIO
N","P= PRINT LAST DIMENSION","C=
 CONTINUE FUNCTION":GOSUB395
380 PCLS5:PRINT@12,"SPECIAL INST
RUCTIONS* MOVE & COPY",,"1. ENCL
OSE TARGET AREA","2. RELEASE BUT
TON","3. MOVE TO NEW AREA","4. P
RESS BUTTON AND FINE ADJUST",,,
385 PRINT"* FIX & FURN",,"1. SEL
ECT DIAGRAM","2. RELEASE & PRESS
 BUTTON TO RO-    TATE",,"4. PRES
S ] TO SWITCH HINGES","5. PRESS
<SPACE> TO SET POSITION"
390 PRINT"* <SPACE>: CHANGE COMM
AND TO DE-  SIGN MODE W/O FUNCTI
ON CHANGE":GOSUB395:GOSUB230:GOT
O295
395 T=(T+1)AND1:PRINT@121,"PRESS
":PRINT@152,"BUTTON>":DRAW"BM190
,34C=T;R58D22L58U22":PK=PEEK(652
80):IFPK=127ORPK=255THEN395ELSER
ETURN
400 SC=(SC+1)AND1:SCREEN1,SC:GOT
O295
405 IFPEEK(49152)<>68THENPRINT@2
57,"WHERE'S DISK BASIC?":SOUND10
0,1:FORT=1TO1500:NEXT:GOTO295ELS
EVERIFYON
410 GOSUB255:PRINT@65,"SAVE":PRI
NT" LOAD":PRINT" RETURN ^":IFP=1
6THENPRINT" DRIVE#"DN
415 GOSUB260:IFV>3THEN415ELSEIFV
=2THEN490ELSEIFV=3THENIFP=16THEN
DN=(DN+1)AND3:PRINT@167,DN;:DRIV
EDN:GOTO415ELSE415
420 POKE65494,0
425 IFV=1THEN435ELSEGOSUB230:GOS
UB250:POKEG+8,24/S:FORI=1TO16:PO
KEG+I+8,ASC(MID$(D$(1)+D$(2),I,1
)):NEXT:IFP=16THENIFFREE(DN)>2TH
ENSAVEMD$(0)+".ARC",G,G+6143,380
:GOTO25ELSEPRINT@22,"DISK FULL":
SOUND100,1:GOSUB225:GOTO410
430 CSAVEMD$(0),G,G+6143,380:GOT
O25
435 PCLS5:IFP=17THENPRINT@256,"P
REPARE TAPE AND ENTER FILENAME B
ELOW. ENTER ^ TO ABORT...":I=22:
GOTO460
440 N=0:CLS:POKE255,255:PRINT@0,
TAB(7)"ARCHIE FILE DRAWER"STRING
$(6,32):POKE255,0
445 FORSE=3TO11:DSKI$DN,17,SE,A$
,B$:A$=A$+LEFT$(B$,127):FORI=0TO
7:K=I*32:B$=MID$(A$,K+1,8):C$=LE
FT$(B$,1):IFC$=CHR$(255)THENI=8:
SE=12ELSEIFC$>CHR$(0)THENIFMID$(
A$,K+9,3)="ARC"THENPRINT" "B$,:
N$(N)=B$:N=N+1
450 NEXTI,SE:PRINT@384," *LOAD",
" *ABORT (^)";:N=N-1
455 H=INT(JOYSTK(0)/32):V=INT(JO
YSTK(1)/5.3)*2:I=H+V:K=I*16+32:P
RINT@K,"\";:PK=PEEK(65280):IFPK=
255ORPK=127THENPRINT@K," ";:GOTO
455
460 IFI=23GOTO490ELSEIFI<22ANDI>
N THEN455ELSEIFI<22THENNF$=N$(I)
+".ARC":GOTO475ELSEIFI=22THENPRI
NT@448,"FILENAME     ";:INPUTNF$
:IFNF$="^"THENPRINT@448,STRING$(
32,32):GOTO490ELSEIFP=17THENNF$=
LEFT$(NF$+STRING$(8,32),8):GOTO4
75
465 E1=INSTR(1,NF$,"."):E2=INSTR
(1,NF$,"/"):IFE1=0ANDE2=0THENNF$
=NF$+".ARC":GOTO465ELSEIFE2>0THE
NMID$(NF$,E2,1)=".":GOTO465ELSEN
F$=LEFT$(LEFT$(NF$,E1-1)+STRING$
(8,32),8)+MID$(MID$(NF$,E1+1)+"
  ",1,3)
470 OPEN"D",#1,NF$,1:LF=LOF(1):C
LOSE:IFLF=0THENKILLNF$:PRINT@448
,"UNABLE TO FIND":GOTO455
475 IFP=16THENLOADMNF$:D$(0)=LEF
T$(NF$,INSTR(2,NF$,".")-1)ELSECL
OADMNF$:D$(0)=NF$
480 PK=PEEK(G+8):D$(1)="":D$(2)=
"":FORI=1TO8:D$(1)=D$(1)+CHR$(PE
EK(G+I+8)):D$(2)=D$(2)+CHR$(PEEK
(G+I+16)):NEXT:IFPK>0THENS=24/PK
:IFME THENSS=30.48/S ELSESS=12/S
485 GOTO25
490 POKE65495-PQ,0:GOSUB230:GOTO
295
495 GOSUB255:PRINT@65,"PRINT":PR
INT" GRID":PRINT" RETURN"
500 GOSUB260:IFV>2THEN500ELSEIFV
=2THENGOSUB230:GOTO295ELSEGOSUB2
30:GOSUB250:IFV=1THENFORH=0TO255
STEP8:FORV=8TO191STEP8:PSET(H,V,
0):NEXTV,H
505 POKE65494,0:IFL=0THENPRINT#-
2,D$(0)CHR$(13)D$(1)CHR$(13)D$(2
)CHR$(13)CHR$(13)
```

```
510 EXEC31462:GOSUB230:GOTO25
515 GOSUB240:S=24/(INT(JOYSTK(0)
/2.8)+2):PK=PEEK(65280):IFPK=255
ORPK=127THEN515ELSE295
520 S1=S:S=4:PCLS5:DRAW"BM0,8C0R
46":PRINT@0,"SELECT:":PRINT@32,"
CHAIRS",,"& SOFAS:"TAB(18)"5'
6'   7'":PRINT@192,"BEDS:  SNGL
FULL QUN  KNG CAL":PRINT@320,"TA
BLES: RND RECT OCT COF  TV":PRIN
T@448,"BED-  CHST  DSK DRSR NS",
"ROOM:"
525 FORI=0TO3:FORK=0TO4:X=64+K*3
6:Y=22+48*I+(1ANDI):DRAW"BM=X;,=
Y;S4A0":ONK+1+I*5 GOSUB620,625,6
30,635,640,645,650,655,660,665,6
70,680,685,690,695,700,705,710,7
15,720:NEXTK,I:S=S1:GOTO545
530 PCLS5:DRAW"BM0,8C0R46":PRINT
@0,"SELECT:":PRINT@64,"DOORS: 2'
0  2'4  2'6  2'8  3'0":O=0:DRAW"
BM60,22S8A0":FORD=8TO12:GOSUB555
:DRAW"BR10":NEXT
535 PRINT@192,"BATH: COMM.  SHOW
ERS    TUB":PRINT@320,"KIT: STOV
E REF  W/D    SINKS":FORI=0TO1:
FORK=1TO5:DRAW"BM"+STR$(6+K*44)+
","+STR$(70+48*I):ONK+I*5GOSUB56
5,570,575,580,560,585,590,595,60
0,605:NEXTK,I
540 PRINT@427,"WALL"TAB(21)"CORN
ER":PRINT@448,"FIRE-"TAB(26),"PL
ACE:":DRAW"BM50,178":GOSUB610:DR
AW"BM138,178":GOSUB615:GOSUB720
545 H=INT(JOYSTK(0)/12.8):V=INT(
JOYSTK(1)/16):PRINT@K+I," ";:I=H
*5+8:K=96+V*128:PRINT@K+I,"\";:P
K=PEEK(65280):IFPK=255ORPK=127TH
EN545
550 W=(V*5+H+1)+(P-12)*19:D=H+8:
M=P+1:IFH+V=7THEN490ELSE60
555 E=D-2:DRAW"C5R=D;UL=D;DC0":I
FO=0THENDRAW"UE=E;UF2D=E;"ELSEDR
AW"U=E;E2DF=E;D":'door
560 RETURN
565 DRAW"R8U3L2GL2HL2ND3BRBU2U4E
2R2F2D4G2L2H2":RETURN:'toilet
570 DRAW"R13U13L7G6D7BE6EFGH":RE
TURN:'corner shower stalls
575 DRAW"NE13R13U13L2BL4LBL4L2NF
13D13":RETURN:'wall shower
580 DRAW"R20U10L2H2L12G2L2D10BR2
BU4U3E2R12F2D3G2L12H2":RETURN:'b
athtub
585 DRAW"R10U8L10D8BR2BU3EFGHBR4
EFGHBU3EFGHBL4EFGH":RETURN:'stov
e
590 DRAW"R10U8NL10HL8GD8":RETURN
:'refrig (30")
595 DRAW"R8U8NL8HL6GD8":RETURN:'
washer, dryer, dishwasher (24")
600 DRAW"R12U8L12D8BRBU3U2ER2FND
2BR2ND2ER2FD2GL2HBL2GL2H":RETURN
:'dbl sink
605 DRAW"R8U8L8D8BE2R4EU3HL4GD3F
BDRBR2R":RETURN:'single sink
610 DRAW"R18U6L2NL2U2H4L6G4D2NR2
L2D6":RETURN:'wall fireplace
615 DRAW"NE3H4E13F4GNG2F2D6G4L6H
2":RETURN:'corner fireplace
620 DRAW"HU8ER8FD8GLNL7U7HL4GD7
BR20":RETURN:wall chair
625 DRAW"LH6UE6RF6DGNG5H5LG3DF5"
:RETURN:'corner chair
630 DRAW"HU8ER18FD8GLNL17U7HL14G
D7":RETURN:'sofa (5')
635 DRAW"HU8ER22FD8GLNL21U7HL18G
D7":RETURN:'sofa (6')
640 DRAW"HU8ER28FD8GLNL27U7HL24G
D7":RETURN:'sofa (7')
645 DRAW"R13U25L13ND25BF2R9D4L9N
U4BG2R13BD3M-13,-1":RETURN:'sgl
bed
650 DRAW"R18U25L18ND25BF2R6ND4BR
2R6D4L6NU4BL2L6NU4BG2R18D3M-18,-
1":RETURN:'full bed
655 DRAW"R20U27L20ND27BF2R7ND4BR
2R7D4L7NU4BL2L7NU4BG2R20D3M-20,-
1":RETURN:'queen bed
660 DRAW"R25U27L25ND27BF2R9ND4BR
3R9D4L9NU4BL3L9NU4BG2R25D3M-25,-
1":RETURN:'king bed
665 DRAW"R24U28L24ND28BF2R9ND4BR
2R9D4L9NU4BL2L9NU4BG2R24D3M-24,-
1":RETURN:'ca king bed
670 R=7*S/4:IF(Y-R)<8THENY=8
675 CIRCLE(X,Y-R),R,0:RETURN:'di
ning table (round)
680 DRAW"R20U12L20D12":RETURN:"d
ining table (rect)
685 DRAW"BU4U6E4R6F4D6G4L6H4":RE
TURN:'dining table (octagon)
690 DRAW"R16U8L16D8":RETURN:'cof
fee table
695 DRAW"R12U7L12D7":RETURN:'tv
700 DRAW"R12U6L12D6":RETURN:'che
st
705 DRAW"R14U6L14D6":RETURN:'des
k
710 DRAW"R20U6L20D6":RETURN:'dre
sser
715 DRAW"R6U6L6D6":RETURN:'night
 stand
720 PRINT@474,"CANCEL";:DRAW"BM2
06,166S4R48D10L48U10"
725 RETURN
```

TELEPHONE UTILITY

16K ECB

Ma Bell Gets Personalized

By Robert C. Lake

Have you ever envied those personalized, or "vanity," phone numbers so many businesses use? You've seen them — like the local used-car dealer's ad that says, "If you want a great deal, just dial GOOD CAR." Wouldn't it be neat if you could tell your friends they should dial NICE GUY?

How do you get those unique phone numbers? Well, it's usually by requesting a particular number from the phone company. In fact, many businesses wait *years* for the right number! In some cases the company already had a "good" number and simply recognized its mnemonic value. Mnemonics are sets of letters or words that can be used to stand for other numbers, ideas, etc. Let's face it, it's easier to remember CARPETS than 227-7387.

But how do you know if your phone number has a useful mnemonic? You could look at the dial or keyboard and try to visualize the words your number might produce. You'd have to be a great visualizer, though; there are thousands of possible combinations for each phone number. My program will do the hard work for you. *Vaniphone* will accept a typical seven-digit phone number and print every combination of the phone dial letters associated with that number.

Some of these combinations will be very good at triggering memory associations, some not so good. Obviously, GOOD CAR is a great mnemonic for a used-car dealer, but less obvious mnemonics can also be used to advantage. For example, want to call the editors of our favorite Color Computer magazine? Well, you could look up the number in the front of this magazine each time you need it, but I'll bet you won't forget that you can also get them by calling A BUGGY Crew. (Just kidding, guys!)

When you run the program, you'll find that some phone numbers will have a large number of combinations. For example, if your number is 234-5678, there are 3 X 3 X 3 X 3 X 3 X 3 X 3 combinations (2,187). You couldn't possibly visualize each of these combinations, but *Vaniphone* displays each and every one for you. Some phone numbers produce a smaller number of combinations, because there are no letters associated with certain digits on the phone dial. This program will print a numerical one wherever a 1 is encountered and a Z whenever a zero is encountered, since these have no letter equivalent.

The program will print the mnemonics either to the screen or to a printer. When the mnemonics are printed on the screen, you can stop the scrolling display at any time by pushing the space bar. Restart the display in the same way.

With this program and a little imagination, you'll find that most phone numbers have useful mnemonics. Have fun!

(Questions about this program may be directed to the author at 3206 Covered Bridge Road, Montgomery, AL 36116, 205-279-8185. Please enclose an SASE for a reply when writing.) ☐

Bob Lake teaches accounting and data processing at Auburn University in Montgomery, Alabama. He is a certified public accountant and holds certificates in data process and as a systems professional.

```
Mnemonics for: 228-4492
AATGGWA AATGGWB AATGGWC AATGGXA
AATGHWB AATGHWC AATGHXA AATGHXB
AATGIWC AATGIXA AATGIXB AATGIXC
AATHGXA AATHGXB AATHGXC AATHGYA
AATHHXB AATHHXC AATHHYA AATHHYB
AATHIXC AATHIYA AATHIYB AATHIYC
AATIGYA AATIGYB AATIGYC AATIHWA
AATIHYB AATIHYC AATIIWA AATIIWB
AATIIYC AAUGGWA AAUGGWB AAUGGWC
AAUGHWA AAUGHWB AAUGHWC AAUGHXA
AAUGIWB AAUGIWC AAUGIXA AAUGIXB
AAUHGWC AAUHGXA AAUHGXB AAUHGXC
```

The listing: VANIPHON

```
 1 REM  *************************
 2 REM  *                       *
 3 REM  *       VANIPHON        *
 4 REM  *                       *
 5 REM  *          BY           *
 6 REM  *                       *
 7 REM  *  ROBERT C. LAKE, CDP  *
 8 REM  *                       *
 9 REM  *                       *
 10 REM *      (C) 1985         *
 11 REM *                       *
 12 REM *************************
 13 CLS:PRINT@202,"PERSONALIZED"
 14 PRINT@266,"PHONE NUMBER"
 15 PRINT @334,"AID"
 16 PRINT@460,"(C) 1985"
 17 FOR J=1TO2000:NEXTJ
 18 CLS
 19 PRINT "THIS PROGRAM IS DESIGN
ED"
 20 PRINT "TO SEARCH FOR A PERSON
ALIZED"
 21 PRINT "MNEMONIC FOR YOUR PHON
E"
 22 PRINT "NUMBER.  IT WILL DISPL
AY ALL"
 23 PRINT "THE POSSIBLE COMBINATI
ONS"
 24 PRINT "OF LETTERS FOR THE PHO
NE "
 25 PRINT "NUMBER YOU PROVIDE."
 26 PRINT:PRINT"TO HALT DISPLAY,
PUSH"
 27 PRINT"THE SPACE BAR.  TO REST
ART"
 28 PRINT "THE DISPLAY, PUSH IT A
GAIN."
 29 PRINT:PRINT"DO YOU WANT THE D
ISPLAY"
 30 PRINT"SENT TO THE pRINTER OR"
 31 PRINT"TO THE sCREEN";
 32 A$=INKEY$:IF A$="S"ORA$="s" T
HEN DEV=0 ELSE IF A$="P" OR A$="
p" THEN DEV=-2 ELSE 32
 33 IF LEFT$(A$,1)="P" OR LEFT$(A
$,1)="p" THEN DEV=-2 ELSE DEV=0
 34 CLS:PRINT"GIVE THE 7-DIGIT PH
ONE"
 35 PRINT "NUMBER YOU WANT TRANSL
ATED."
 36 PRINT "DO NOT INCLUDE A DASH,
 ONLY"
 37 PRINT "THE SEVEN DIGITS.
 38 DIM D$(10,3)
 39 M(0)=1
 40 M(1)=1
 41 FOR J=2 TO 9:M(J)=3:NEXTJ
 42 FOR J=0TO9
 43 FOR K=1TO3
 44 READ D$(J,K)
 45 NEXT K
 46 NEXT J
 47 DATA "Z","*","*","1","*","*"
 48 DATA "A","B","C","D"
 49 DATA "E","F","G","H","I","J"
 50 DATA "K","L","M","N","O","P"
 51 DATA "R","S","T","U","V","W"
 52 DATA "X","Y"
 53 INPUT N$
 54 N1=0
 55 FOR J=1TO7
 56 N(J)=VAL(MID$(N$,J,1))
 57 IF N(J)=0 OR N(J) =1 THEN N1=
N1+1
 58 NEXT J
 59 SUM=INT(3^(7-N1))
 60 PRINT:PRINT SUM;" COMBINATION
S "
 61 PRINT "WILL BE DISPLAYED":PRI
NT
 62 PRINT#DEV:PRINT #DEV,"MNEMONI
CS FOR: ";MID$(N$,1,3);"-";MID$(
N$,4,4):PRINT #DEV
 63 FOR J1=1TO3
 64 FOR J2=1TO3
 65 FOR J3=1TO3
 66 FOR J4=1TO3
 67 FOR J5=1TO3
 68 FOR J6=1TO3
 69 FOR J7=1TO3
 70 IF D$(N(1),J1)="*" OR D$(N(2)
,J2)="*" OR D$(N(3),J3)="*" THEN
 76
 71 IF D$(N(4),J4)="*" OR D$(N(5)
,J5)="*" OR D$(N(6),J6)="*" THEN
 76
 72 IF D$(N(7),J7)="*" OR D$(N(8)
,J8)="*" OR D$(N(9),J9)="*" THEN
 76
 73 PRINT #DEV,D$(N(1),J1);D$(N(2
),J2);D$(N(3),J3);D$(N(4),J4);D$
(N(5),J5);D$(N(6),J6);D$(N(7),J7
);" ";
 74 A$=INKEY$:IFA$=" "THEN 75 ELS
E 76
 75 A$=INKEY$:IFA$=" "THEN 76 ELS
E 75
 76 NEXTJ7:NEXTJ6:NEXTJ5:NEXTJ4:N
EXTJ3:NEXTJ2:NEXTJ1
 77 PRINT #DEV
```

PIPELINE

RISE AND FALL After a decade of supporting different operating systems, Frank Hogg Laboratory, Inc., has decided to stay exclusively with OS-9, both the 6809 and 68000 versions. FHL has discontinued their support of Flex, both Standard 6809 and CoCo. Because of this, they no longer sell CCFlex.

FHL will be supporting the CoCo 3 and all of its pertinent products. Many in the CoCo Community are already aware of the hardware and software products FHL will be marketing for OS-9 Level II on the CoCo 3. The reason FHL has made the decision to support only OS-9 is that, with full CoCo 3 support, as well as their continuing line of QT computers and products, they found it necessary to concentrate on one area. They believe OS-9 is an operating system that suits their needs as well as the needs of their customers.

NO FOOLING We have recently come across a copy of an official New York state document, Form X201 (Certificate of Conducting Business under an Assumed Name for Individual). This form, which was filed by one Robert Harry Rosen, certifies the transaction of business for this individual under the name of Spectrum Projects and is dated April 1, 1982. We have no idea what implications arise from that specific date except that Spectrum Projects just recently celebrated its fifth business anniversary. Bob Rosen says, "While I am pleased and proud that we have passed this milestone, we're looking ahead to the next five years and our 10th anniversary!"

Happy anniversary, Bob!

COLORFUL IDEA If you are looking for color ribbons for your Radio Shack DMP-130 printer, we have found a source. Marty's Rubber Stamp Shop is now carrying printer ribbons for the DMP-130 in red, green, blue, brown and purple, as well as traditional black. The price for the color ribbons is $13, and the black ribbons sell for $9. Marty's does offer quantity discounts — a great idea for CoCo clubs. In addition, clubs may want to contact Marty's to get a price on bulk refills. *Contact Marty's Rubber Stamp Shop, 47 South Second Street, Saint Clair, PA 17970, (717) 429-1052.*

QUICK CABLES Ohm/Electronics, Inc., has announced the availability of a variety of customizing 9- and 25-pin Scooter RS-232 Interface Cable Kits. The cable kits are intended for field service technicians, engineers, installers and hobbyists. A provided insertion/extraction tool allows the user to quickly change the pin arrangement to meet the needs of any computer or computer accessory interface. Each kit also contains a 5- or 10-foot, nine-conductor, foil-shielded RS-232 cable with ends crimped with gold contacts, two hoods with strain reliefs, two connector blocks, jumper cables and all other mounting hardware including a screwdriver. A deluxe option includes the above, plus an RS-232 Mini-Tester, which uses LEDs to show lead activity and polarity. The tester has one male and one female 25-pin connector with all 25 pins connected straight through the tester. The kits are available in several different configurations ranging in price from $24.95 to $31.50. *Contact Ohm/Electronics, Inc., 746 Vermont Street, Palatine, IL 60067.*

VCR HELPER Sunrise Software proudly announces its latest software for the Color Computer, *VCR File*. This new program was written by John Fiske, author of *Superdisk Utility*, and operates on all three models of the Color Computer. It requires 32K of memory and one disk drive. Use of a printer is optional.

VCR File is shipped with a complete operator's manual. It is not copy-protected, but it is run-protected. The program can store over 750 entries of movie or camcorder programs. It sorts to the screen or printer. It also calculates the amount of tape available on the cassettes entered in the file.

VCR File is also easily adaptable to other collections of information, such as LP recordings, audio cassettes and other tape products, computer disks and tapes, and other similar applications. The price for *VCR File* is $19.95, plus $2 S/H. Florida residents need to add $1 for sales tax. *Contact Sunrise Software, 8901 NW 26 Street, Sunrise, FL 33322, (800) 628-2828.*

DRIBBLERS BEWARE Software Exchange has introduced *Professional Basketball Handicapping System*, a program designed for the ardent basketball enthusiast. With the system, anyone can quickly handicap the weekly NBA basketball games using information found in the daily newspaper sports section. This disk-based program stores the basketball data entered for the teams and later uses it for handicapping. Data can be displayed onscreen or printed. The price for the system is $49.95 plus $2 S/H. *To get the* Professional Basketball Handicapping System *for your CoCo, call (800) 527-9467. VISA and MasterCard accepted.*

FREE TAXES? A program that was previously not available for public distribution is now being offered to CoCo owners for free. *CoCo Federal Tax* requires a 64K Color Computer with one disk drive. This tax preparer's tool is comprised of 39 programs, which cover Form 1040, Schedules A, B, C, D, E, G, SE and W, and Forms 2441, 4562 and 6251. *Send an SASE and three disks along with your request to Puritas Springs Software, 17140 Lorain Avenue, Cleveland, OH 44111.*

Real-Life Uses for the Seven-Value CIRCLE Statement

By Joseph Kolar
Rainbow Contributing Editor

Before we embark upon our odyssey through the promised graphics tutorials, we shall pause and reflect on the ubiquitous `CIRCLE` statement.

`CIRCLE` was never previously considered in its range of possibilities. There is no time like the present to correct this oversight. You may prefer to thumb through your manual to get an overview of `CIRCLE` before we demonstrate some real-life uses of the seven-value `CIRCLE` statement.

Starting with a blank Hi-Res screen, our object is to create a simple "happy face," replete with ears and hair. Using concatenation and gobs of `GOSUB`s, we shall animate the eyes, causing them to scan from side to side.

Thanks to a typing error, pressing E instead of 3, we shall animate the mouth. Instead of correcting an error, we use it to get a desired effect.

From `LISTING1` key in lines 100, 110 and 300. After each new program line is added, run it to check out your work to follow along with this growing program. You will see how it was developed, item by item. Note that the location of the `CIRCLE` is 130,98 (the first two values in the statement). Originally, it was 128,96, the center of the screen. It was adjusted two units to the right and two units down. The facial features were created slightly off-center and, to compensate and re-center the happy face, it was easier to move the circle rather than do massive relocating of all the facial components.

This face was created dynamically from nothing and, being both wise and lazy, I took the easy way out. You, too, are expected to move components around the screen with a minimum of effort. Creating should be fun — not drudgery.

The circle was arbitrarily made 50 units in diameter (third value), and Color 1 in the two-color set was used (fourth value). Color 1 displays a feature and Color 0 blanks it out.

Whenever a design element, such as an eye socket, is needed two or more times, it is better to label the element with a string variable and call it as many times as required in the program using concatenation.

Key in Line 120 to get the eye socket. Key in Line 125 but temporarily omit the ending, `:GOTO200`.

You may use the following alternate Line 125 and get substantially the same result: `125 DRAW"BM110,90"+A$+"BR30"+A$`. In this case, we located the left eye socket. Since it was drawn to finish at the starting point (see Line 120), adding `BR30` no draw units to the right locates the other socket. One way is as good as the other.

In order to add a left ear, we have to design its shape. The simplest one is a jug ear, or the left half of a circle. CoCo's `CIRCLE` statement does this with a minimum of effort. Key in Line 111. The left ear was sized at a diameter of 10 (third value) and displayed in Color 1 (fourth value). To create only the left half of the circle, we decided the shape of the ear. The height/width ratio of a circle is 1. If we want to make the circle more elongated, we use 1.1 as the next value (fifth value) of the `CIRCLE` statement. If we decide to flatten it, we can use .8 or .9.

To make a half-circle representing the left ear, we must know that the starting point CoCo recognizes is 0 at 3 o'clock, and goes in a clockwise direction. Thus, our starting point is at the bottom, or 6 o'clock. This is one fourth the distance around the circumference or .25. This decimal value is the sixth value required in our `CIRCLE` statement.

We want our ear to end at 12 o'clock. This is three-fourths of the way around the boundary of the circle, or .75. This is the last value in our completed `CIRCLE` statement in Line 111. It is merely a matter of changing the H,V locations to jockey the left ear, thus tacking it onto the side of the face.

One ideal method of attack is to create the desired element in an unused part of the screen — say at location 20,20. After your design is completed, it is no problem to maneuver it to the desired location by changing the H,V values. This system avoids the confusion of trying to create some element amid distractions offered by working on, over or near completed elements.

The right ear is the mirror image of the left ear — the other half of the circle. It begins at high noon and ends at 6

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

o'clock. Merely reverse the last two values you used to create the left ear in *Line 111*.

Key in Line 112. For the heck of it, change the fifth value from .9 to 1.1 and compare ears! Pick your own poison and adjust lines 111 and 112 accordingly.

We could use a token wild hair on top of the happy face dome to signify a luxuriant growth of hair. Key in Line 113. It is no problem to locate it horizontally. Just pick up the center point of the big circle.
a smaller hair on each side of the token hair, using a multiple-line statement. Key in Line 114. Note: The hairs are not as zig-zaggy or as long. This may be a questionable addition to our happy face, but that vast bald expanse cried out for hair.

The nose is next. A U-shaped nose suffices for our purpose. Key in Line 115.

If you prefer, you may link the nose to the eye sockets by altering Line 115. After `BL` insert `NU4` and change the `9` at the end to `13`.

Of course, you could have made the eye sockets and nose in one continuous line, but who can anticipate what we shall dream up? If you did, you wouldn't have to use concatenation and it would be a whole new ball game. If you care to fool around, work it out!

To create a curvy mouth, key in Line 116. This program line may look strange to you. But take it on good faith. It will be thoroughly explained a few tutorials down the pike.

At this stage, we have a bushy, jug-eared, happy face. I plan to use crossed lines to make a pair of eyes. Since we expect to move the pair of eyes as a unit, we must have one pair displayed using `C1` and one pair blanked out using `C0`, using string variables, `B$` and `C$`, respectively.

Key in lines 121 and 122. To display the eyes, we shall have to locate them and use concatenation to turn them on. Key in Line 130, temporarily omitting `GOSUB105:`. Then to blank them out, key in Line 131, temporarily omitting `GOSUB105:` and `:RETURN`.

The picture whizzed by so swiftly the eyeballs didn't show up. They were instantly erased. A time pause is called for. We shall use the pause repeatedly. Therefore, we need a `GOSUB` routine that we can place almost anywhere, out of harm's way, in the program. Key in Line 105.

Now, when you run it, CoCo is driven up the wall and bleats out `RG ERROR IN 105`. We quieten CoCo's nerves by keying in Line 104, which signals CoCo to bypass the offensive line.

To put the pause into effect, insert `GOSUB105:` at the beginning of Line 131. If we use only eyeballs, we do not get as great an illusion of eye movement. Thus, we will use an alternate set of X-shaped eyeballs. This set of X-shaped eyeballs will be designated `D$` and will be blanked out using `E$`. Key in lines 123 and 124.

To display the X eyes, key in Line 140, temporarily omitting `GOSUB105:`. You will see that a pause is badly needed. Edit Line 140 and insert `GOSUB105:` at the beginning.

To blank out the X eyes, key in Line 141, temporarily omitting both `GOSUB105:` and `:RETURN`. After checking it out, the point being made, insert `GOSUB105:` at the beginning of Line 141.

It is obvious that if we want the eyes to continuously recycle, we could end with `150 GOTO 125`. To make the eyes move around in an haphazard position, we should put the pair into `GOSUB` routines. So, to create `GOSUB` routines, add `:RETURN` to both lines 131 and 141.

We get our usual R/G Error messages awakening us to create an operating line. Key in `200 GOSUB130:GOSUB140 :GOTO125`.

Insert `GOSUB105:` in front of Line 130. Add `:GOTO200` at the end of Line 125. This urges CoCo, after displaying the eye socket, to shoot down to Line 200, the operating line, to select the desired `GOSUB`s.

To move the eyes over one more unit, using a multiple-line statement, key in Line 150, which is the `GOSUB` routine to accomplish the mission. Edit Line 200 to insert `:GOSUB150` in front of `:GOTO125`.

"This urges CoCo, after displaying the eye socket, to shoot down to Line 200, the operating line, to select the desired GOSUBs."

To get the eye to return to the center, merely edit Line 200 to insert `:GOSUB140:GOSUB130` in front of `GOTO125`.

To make the eyes move to the left of center, key in lines 160 and 170, temporarily omitting `:GOSUB500` in both lines 160 and 170. Edit Line 200 to insert `:GOSUB160:GOSUB170: GOSUB160:GOSUB130` in front of `:GOTO125`.

Our next objective is to make the mouth appear and disappear. We placed the routine at the end of the program because it was experimental. We wanted to see what would come up and if we should use it.

Key in Line 500. To place it inside the working program, insert `GOSUB500:` in front of `RETURN` in both lines 160 and 170. Now we can give it the acid test.

The reason we got this misbegotten mouth, as alluded to at the beginning of this tutorial, is when I was copying Line 116 into the mouth routine at Line 500, I pressed E instead of 3 in half of the routine. When it didn't work properly, I noticed both `FE` and `F3`. I corrected the wrong one. Instead of changing `FE` to `F3`, I compounded the mistake by changing `F3` to `FE`.

Here is where two wrongs make a right. Inadvertently, the mouth opened and shut. It added to the animation, so it was incorporated into the program.

Notice how we have `GOSUB`s nested in `GOSUB` routines. It is no different than nested `GOTO` routines.

Type `CSAVE"LISTING1"`. Here is a variation that uses only the + eyes: Rekey `200 GOSUB130:GOSUB150: GOSUB170:GOTO125`.

Try this variation: Rekey `200 GOSUB140:GOSUB160:GOTO125`. To make the eyes move randomly, rekey `200 X=RND(5):ON X GOTO 201,202,203,204,205`.

Add:

```
201 GOSUB130:GOTO200
202 GOSUB140:GOTO200
203 GOSUB150:GOTO200
204 GOSUB160:GOTO200
205 GOSUB170:GOTO200
```

A nicer variation is to edit the previous version and delete `:GOTO200` from lines 201 to 204. Can you spot the differing results? Save any variation you might want as a jumping off point for further experimentation.

Now that you have this down pat, why not make the eyeballs appear to rotate by changing the + to X and spin the eyeballs? Rip this tutorial apart and try to come up with something original.

To make the wild hair spin, alter the previous variation as shown in `LISTING2`, which is the same except for adding lines 106 and 600 and altering lines 201, 202 and 203. Type `CSAVE"LISTING2"`.

You must be groggy from watching the spinning hair. Type `CLOAD"LISTING1"`. What do you say we elongate the head? Add `,1.1,` to Line 110. The head will be longer. The only adjustment necessary is relocating the three hairs on his dome, lines 113 and 114. Do it!

Let us flatten the head by changing `1.1` to `.9` in Line 110. Again, adjusting lines 113 and 114 solves the problem. Either elongated or flattened, the happy face looks more natural. `CSAVE` at your discretion.

To give the appearance of spinning (if not flashing) eyes, type `CLOAD"LISTING1"`. In Line 105, change `150` to `20`.

In lines 140 and 141, change `115` to `114` and `145` to `144`.

Delete Line 150. Rekey `200 GOSUB130:GOSUB140:GOSUB105:GOTO125`. What have we learned? If you are an expert, nothing much. But, if you are a newcomer to CoColand, you've learned to play with the `CIRCLE` statement. You've learned to animate eyes, spin hairs and open and shut a mouth.

You could wiggle the ears and nose. The name of the game is experiment. See what happens when you do the unexpected. It is exciting to be confronted by a new, *unanticipated* result. This is the fun part that makes newcomers glad they bought their CoCo.

This happy face can be embellished further with eyebrows. They could be raised or lowered. The eyeballs could be circles, V's or upside-down V's. An Adam's apple could be added and made to bob up and down.

Heck! The face could be alternated from elongated to flattened. You will have to do a lot of relocating, but that is all part of being creative.

If you create some proud masterpiece and want to share it with me, feel free to send me a listing. In the meantime, I am going to keep playing around with the happy face. Next month, you will see some other modifications. Aren't you glad to be a citizen of CoColand? ☐

Two-Liner Contest Winner . . .

Here's one to print labels for your disks. It runs on the DMP-105 from Radio Shack.

The listing:

```
10 LINEINPUT"dsk.no";D$:LINEINPU
T"dsk.name";N$:LINEINPUT"rev.sid
e";R$:D=INT((18-LEN(D$))/2):N=IN
T((18-LEN(N$))/2):R=INT((27-LEN(
R$))/2):PRINT#-2,CHR$(27);CHR$(2
0);CHR$(27);CHR$(31);"RSDOS"STRI
NG$(36,32)"TRS80/COCO";CHR$(27);
CHR$(32);CHR$(27);
20 PRINT#-2,CHR$(23);CHR$(27);CH
R$(14);CHR$(27);CHR$(28);CHR$(13
);STRING$(D,32)D$;CHR$(13);CHR$(
13);CHR$(13);STRING$(N,32)N$;CHR
$(27);CHR$(15);CHR$(27);CHR$(23)
;CHR$(27);CHR$(31);CHR$(13);CHR$
(13);CHR$(13);STRING$(R,32)"Rev.
Side> "R$;CHR$(13):GOTO10
```

David Johnson
Leicester, NC

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

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Listing 1:

```
0 '<LISTING1>
100 PMODE4,1:PCLS:SCREEN1,0
104 GOTO110
105 FORZ=1TO150:NEXT:RETURN
110 CIRCLE(130,98),50,1
111 CIRCLE(80,96),10,1,.9,.25,.7
5
112 CIRCLE(180,96),10,1,.9,.75,.
25
113 DRAW"BM130,48H3E3H3E3H3E3H3"
114 DRAW"BM105,56U2H4U4H4":DRAW"
BM155,56U2E4U4E4"
115 DRAW"BM127,95BLD9F3R5E3U9"
116 DRAW"C1BM112,118F3M+15,7R5M+
15,-7E3"
120 A$="C1BL2E5R7F5G5L7H5"
121 B$="C1R3NU2ND2R3"
122 C$="C0R3NU2ND2R3"
123 D$="C1BU2F4BU4G4"
124 E$="C0BU2F4BU4G4"
125 DRAW"BM110,90"+A$:DRAW"BM140
,90"+A$:GOTO200
130 GOSUB105:DRAW"BM114,90"+B$:D
RAW"BM144,90"+B$
131 GOSUB105:DRAW"BM114,90"+C$:D
RAW"BM144,90"+C$:RETURN
140 GOSUB105:DRAW"BM115,90"+D$:D
RAW"BM145,90"+D$
141 GOSUB105:DRAW"BM115,90"+E$:D
RAW"BM145,90"+E$:RETURN
150 GOSUB105:DRAW"BM116,90"+B$:D
RAW"BM146,90"+B$:GOSUB105:DRAW"B
M116,90"+C$:DRAW"BM146,90"+C$:RE
TURN
160 GOSUB105:DRAW"BM113,90"+D$:D
RAW"BM143,90"+D$:GOSUB105:DRAW"B
M113,90"+E$:DRAW"BM143,90"+E$:GO
SUB500:RETURN
170 GOSUB105:DRAW"BM112,90"+B$:D
RAW"BM142,90"+B$:GOSUB105:DRAW"B
M112,90"+C$:DRAW"BM142,90"+C$:GO
SUB500:RETURN
200 GOSUB130:GOSUB140:GOSUB150:G
OSUB140:GOSUB130:GOSUB160:GOSUB1
70:GOSUB160:GOSUB130:GOTO125
300 GOTO300
500 DRAW"C0BM112,118FEM+15,7R5M+
15,-7E3":GOSUB105:DRAW"C1BM112,1
18FEM+15,7R5M+15,-7E3":RETURN
```

Listing 2:

```
0 '<LISTING2>
100 PMODE4,1:PCLS:SCREEN1,0
104 GOTO110
105 FORZ=1TO150:NEXT:RETURN
106 FOR Z=1 TO 50:NEXT:RETURN
110 CIRCLE(130,98),50,1
111 CIRCLE(80,96),10,1,.9,.25,.7
5
112 CIRCLE(180,96),10,1,.9,.75,.
25
113 DRAW"C1BM130,48H3E3H3E3H3E3H
3"
114 DRAW"BM105,56U2H4U4H4":DRAW"
BM155,56U2E4U4E4"
115 DRAW"BM127,95BLD9F3R5E3U9"
116 DRAW"C1BM112,118F3M+15,7R5M+
15,-7E3"
120 A$="C1BL2E5R7F5G5L7H5"
121 B$="C1R3NU2ND2R3"
122 C$="C0R3NU2ND2R3"
123 D$="C1BU2F4BU4G4"
124 E$="C0BU2F4BU4G4"
125 DRAW"BM110,90"+A$:DRAW"BM140
,90"+A$:GOTO200
130 GOSUB105:DRAW"BM114,90"+B$:D
RAW"BM144,90"+B$
131 GOSUB105:DRAW"BM114,90"+C$:D
RAW"BM144,90"+C$:RETURN
140 GOSUB105:DRAW"BM115,90"+D$:D
RAW"BM145,90"+D$
141 GOSUB105:DRAW"BM115,90"+E$:D
RAW"BM145,90"+E$:RETURN
150 GOSUB105:DRAW"BM116,90"+B$:D
RAW"BM146,90"+B$:GOSUB105:DRAW"B
M116,90"+C$:DRAW"BM146,90"+C$:GO
SUB600:RETURN
160 GOSUB105:DRAW"BM113,90"+D$:D
RAW"BM143,90"+D$:GOSUB105:DRAW"B
M113,90"+E$:DRAW"BM143,90"+E$:GO
SUB500:RETURN
170 GOSUB105:DRAW"BM112,90"+B$:D
RAW"BM142,90"+B$:GOSUB105:DRAW"B
M112,90"+C$:DRAW"BM142,90"+C$:GO
SUB500:RETURN
200 X=RND(5):ON X GOTO201,202,20
3,204,205
201 GOSUB130:GOSUB600
202 GOSUB140:GOSUB600
203 GOSUB150:GOSUB600
204 GOSUB160:
205 GOSUB170:GOTO200
300 GOTO300
500 DRAW"C0BM112,118FEM+15,7R5M+
15,-7E3":GOSUB105:DRAW"C1BM112,1
18FEM+15,7R5M+15,-7E3":RETURN
600 FORY=1 TO 3:DRAW"C0BM130,48H
3E3H3E3H3E3H3":GOSUB106:DRAW"C1B
M130,48E3H3E3H3E3H3E3":DRAW"C0BM
130,48E3H3E3H3E3H3E3":DRAW"C1BM1
30,48H3E3H3E3H3E3H3":NEXT:RETURN
```

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S-P Analysis: Comparing The Curves

By Michael Plog, Ph.D.
Rainbow Contributing Editor

Normally, I deal with rather broad issues related to computers and education. However, I would like to make a departure from my usual type of article. This month, I want to present a very specific application of a computer to help teachers in classrooms.

Perhaps a little explanation is in order. I teach a part-time course for a local university. One of the duties of any teacher is to assign grades to students. Most teachers use tests to determine those grades, and I am no exception. A teacher's most hated job is grading test papers. This task is unavoidable, however, and the other day I found myself with red pen in hand and a challenge on the desk.

While going through the tests, something did not seem right. Responses from the students just felt wrong. I checked the tests with some simple analyses of students and test items. The result is this article. This month, we will be dealing with a use of the computer to examine characteristics of teacher-made tests. I hope other teachers can use the procedures outlined here to learn a little more about their own tests.

Once I decided to examine the test, it was time to crank up the Color Computer. Of course, I used a word processing package to prepare and print the test. I also keep student grades and lecture notes in computer form. But for this activity, I needed a spreadsheet. Any spreadsheet will do the job.

A spreadsheet is made up of rows and columns. For our purposes today, think of rows as students and columns as test items. The value in each cell is a 1 if the student answered the item correctly, and a 0 if the item is incorrect.

I used an additional column for student name, and one for total number of items answered correctly. Although not necessary, I used one column for the percentage of total correct responses for each student. Likewise, one row is used for the test item number (sort of the name of the item), one row for total number of students correctly answering the item, and one row for percent of students with correct answers.

One major reason for using a spreadsheet is to let the computer calculate the totals and percents. I'll discuss a second reason later.

While the idea here is very simple, the words that have to be used are difficult. An example makes this easier to understand. In Table 1, 14 students responded to 10 items on a test. (This is a sample. The actual test involved more students and more items.)

One way of looking at the table is to examine students. Albert Adams, for example, answered every test item correctly. In the column named "Num," we see 10 correct test items, for a percent

Table 1: Test Results

	Item Number										
	1	2	3	4	5	6	7	8	9	10	Num	%
Adams	1	1	1	1	1	1	1	1	1	1	10	100
Baker	1	1	1	1	0	1	1	1	1	1	9	90
Crowner	1	1	1	1	1	1	1	0	1	1	9	90
Davis	1	1	1	0	0	1	1	1	1	1	8	80
Edwards	1	1	1	1	0	1	1	1	1	1	9	90
Franks	1	1	0	0	1	1	0	1	1	1	7	70
Grayson	0	1	0	1	0	1	1	1	1	1	7	70
Holston	1	1	1	0	1	1	0	0	1	1	7	70
Iverson	1	1	1	1	1	1	1	1	1	1	10	100
Johnson	1	1	0	0	0	1	1	1	0	1	6	60
Kelley	1	1	1	1	1	0	1	1	0	1	8	80
Levin	1	0	1	0	1	1	1	0	1	1	7	70
Martin	1	0	0	1	0	0	1	1	1	1	6	60
Normans	1	0	0	0	0	0	1	1	1	1	5	50
Number	13	11	9	8	7	11	12	11	12	14		
Percent	93	79	64	57	50	79	86	79	86	100		

Michael Plog received his doctorate degree from the University of Illinois. He has taught social studies in high school, worked in the central office of a school district and is currently employed at the Illinois State Board of Education.

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("%" column) of 100 percent. Nora Normans answered only five of the 10 correctly, for a score of 50 percent.

In addition to examining students, we can also consider the test items (called problems) as shown in the table. Item 10, for example, was answered correctly by all 14 students. Item 5 was answered correctly by seven (50 percent) students. Thus, Item 10 is the easiest problem on the test, and Item 5 is the most difficult. This procedure then becomes a simple item analysis of your test.

The other reason for using a spreadsheet is to sort your table. In this procedure, two sorts are needed. First, rank order each item on the test from least difficult to most difficult. Difficulty of item is determined by how many students correctly answered the item. Thus, the most difficult item is that one answered correctly by the fewest number of students. The easiest item is the one answered correctly by the greatest number of students.

The second sort is to rank order your spreadsheet by student raw score. The student correctly answering the most questions is at the top of the list; the student correctly answering the fewest test items is at the bottom of the list. Your newly sorted spreadsheet will now look like Table 2.

Table 2: Test Results After Sorting

	Item Number											
	10	1	7	9	2	6	8	3	4	5	Num	%
Adams	1	1	1	1	1	1	1	1	1	1	10	100
Iverson	1	1	1	1	1	1	1	1	1	1	10	100
Baker	1	1	1	1	1	1	1	1	1	0	9	90
Crowner	1	1	1	1	1	1	0	1	1	1	9	90
Edwards	1	1	1	1	1	1	1	1	1	0	9	90
Davis	1	1	1	1	1	1	1	1	0	0	8	80
Kelley	1	1	1	1	1	0	1	1	1	0	8	80
Franks	1	1	0	1	1	1	1	0	0	1	7	70
Grayson	1	0	1	1	1	1	1	0	1	0	7	70
Holston	1	1	1	1	1	1	0	0	0	1	7	70
Levin	1	1	1	1	0	1	0	1	0	1	7	70
Johnson	1	1	1	0	1	1	1	0	0	0	6	60
Martin	1	1	1	1	0	0	1	0	1	0	6	60
Normans	1	1	1	1	0	0	1	0	0	0	5	50
Number	14	13	13	13	11	11	11	8	8	6		
Percent	100	93	93	93	79	79	79	57	57	43		
	Most Easy Item									Most Hard Item		

From Table 2, you can tell that Adams and Iverson got the highest scores in class. Also, Item 10 is the easiest item on the test, and Item 5 is the most difficult.

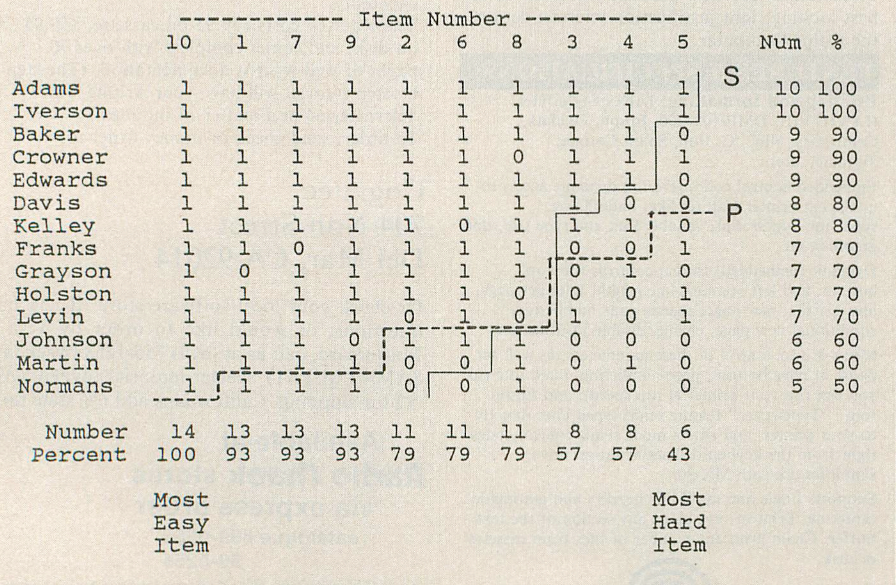
Now comes the part that is hard to describe. We are going to convert Table 2 into an "S-P Chart" (shown in Table 3). The 'S' stands for "Student"; the 'P' stands for "Problem," or test item. An S-P Chart is a matrix in which students (rows) are arranged from top to bottom in descending order of total test score. The problems, or test items (columns), are arranged from left to right in ascending order of difficulty. Two lines are drawn on the S-P Chart. The first is the S-curve, shown here as a solid line. It is drawn by placing a vertical line over each student corresponding to the total test score earned by the student.

Both Adams and Iverson got all 10 problems correct, so the S-curve is to the right of the tenth item. Baker got nine of the 10 items correct, so the S-curve is between the ninth and tenth item.

The second line is the P-curve, shown in Table 3 as a dotted line. What the S-curve is to students, the P-curve is to problems, or test items. A horizontal line is drawn over each problem corresponding to the number of students answering that problem correctly. Thus, Item 10 was answered correctly by 14 students and has a line below the 14th student. Item 1 was answered correctly by 13 students and has a line between the 13th and 14th student.

Directions for drawing the two curves are difficult to say in words, but fairly easy to actually draw on the table. Please examine Table 3 to see the lines.

Table 3: S-P Chart



	Item Number											
	10	1	7	9	2	6	8	3	4	5	Num	%
Adams	1	1	1	1	1	1	1	1	1	1	10	100
Iverson	1	1	1	1	1	1	1	1	1	1	10	100
Baker	1	1	1	1	1	1	1	1	1	0	9	90
Crowner	1	1	1	1	1	1	0	1	1	1	9	90
Edwards	1	1	1	1	1	1	1	1	1	0	9	90
Davis	1	1	1	1	1	1	1	1	0	0	8	80
Kelley	1	1	1	1	1	0	1	1	1	0	8	80
Franks	1	1	0	1	1	1	1	0	0	1	7	70
Grayson	1	0	1	1	1	1	1	0	1	0	7	70
Holston	1	1	1	1	1	1	0	0	0	1	7	70
Levin	1	1	1	1	0	1	0	1	0	1	7	70
Johnson	1	1	1	0	1	1	1	0	0	0	6	60
Martin	1	1	1	1	0	0	1	0	1	0	6	60
Normans	1	1	1	1	0	0	1	0	0	0	5	50
Number	14	13	13	13	11	11	11	8	8	6		
Percent	100	93	93	93	79	79	79	57	57	43		
	Most Easy Item									Most Hard Item		

Think for a moment of the ideal situation. If the students in your class are perfectly rank ordered by ability (which they probably will not be), and your test is a perfect test (which none of mine are), the S-curve and the P-curve will be exactly the same line. The best student in your class will answer all your test questions that the second-best student answers, plus will get some correct that the second-best student will miss.

Likewise, consider your test items. The most difficult test items will be answered only by the best student in class. The second most difficult test items will be answered correctly by the best student *and* the second-best student in class. And so on, for each item on your test. As the level of difficulty gets easier, more students will answer the item correctly.

If you have constructed the perfect test for the perfect class, there will be no 1s to the right of the S-curve or below the P-curve. Likewise, there will be no 0s to the left of the S-curve or above the P-curve. The value of the S-P Chart is that you can identify areas of concern in your test items and your students.

You can easily tell from Table 3 that I did not construct the perfect test. One area of concern for me would be Item 8. This item was answered correctly by the three worst students in class, but missed by one student who scored 90% on the test. Why did Crowner miss Item 8 while Johnson, Martin, and Normans all got it right? Is there something wrong with Item 8, or something out of kilter with the students?

Another area of concern is Item 5, the most difficult item on the test. Of the six students who correctly answered Item 5, half are above the P-curve (where they should be), but half are below the P-curve (where they should not be).

The key to your S-P analysis is your judgment about the items and the students. Perhaps Crowner was sick the day we dealt with the information in Item 8. Perhaps Item 8 was written in a way that confused Crowner (normally a good student). Perhaps Item 5 is such a bad test question that all students guessed at it, and only six students were lucky.

A perceptive teacher can use S-P analysis to improve test items, which will improve the way measurement of student knowledge is determined. By having better classroom tests, teachers can make a firmer decision about student abilities. This should lead to better curriculum planning for individual students.

> ***"By having better classroom tests, teachers can make a firmer decision about student abilities."***

This description is only the first step in S-P analysis. The entire system provides much more information than presented here. S-P analysis can be explained in detail by Dr. Delwyn Harnisch of the Institute for Child Behavior and Development at the University of Illinois in Champaign. Even at its most simple application, however, S-P analysis may be a worthwhile tool for teachers concerned about classroom tests.

That is all for now. If you have comments or questions, contact me at 829 Evergreen, Chatham, IL 62629.

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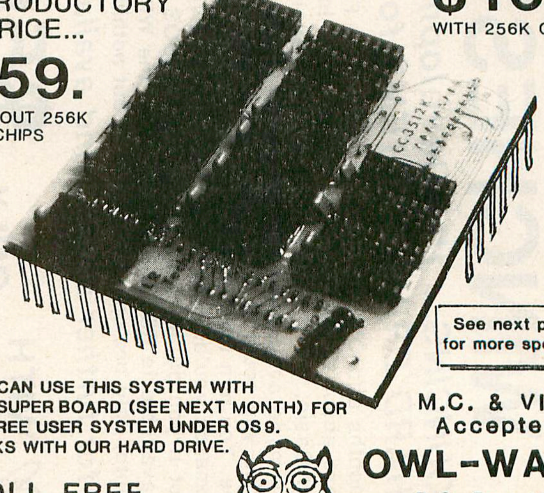

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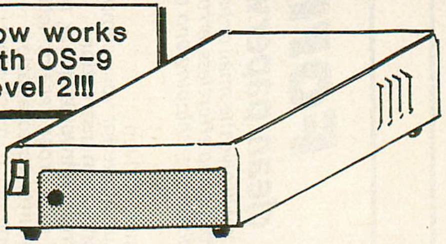

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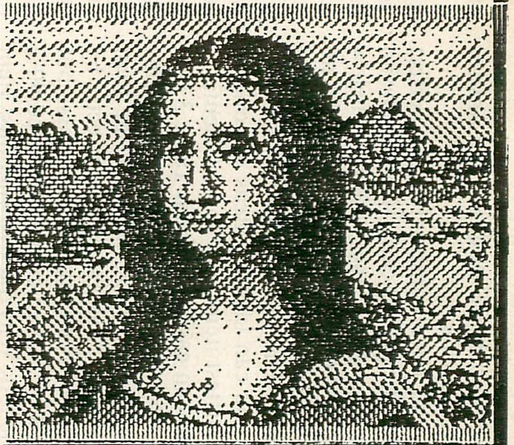

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The new Color Computer owner buys his/her versatile machine for its graphics and music capabilities, organization of their home and office, educational purposes — both in the home and school and to acquire programming knowledge — and some, simply for pure fun and entertainment.

As far as the CoCo is concerned, the more you learn, the more you realize how little you actually know. That is why every session at the keyboard is an adventure in learning.

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" will contain shorter BASIC program listings that will entertain and help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Contributions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and will be useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we do not have the time to key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

— Jutta Kapfhammer
Submissions Editor

CoCo 3

CoCo 3

That's The Way The Ball Bounces

By Ted Kyte

The following program uses the `PALETTE` command to simulate the rotation of a ball and a fluctuating border. The `GET` and `PUT` commands are used to bounce the ball around the screen.

The listing: `BALLDEMO`

```
1 ' BOUNCING BALL
2 ' BY TED KYTE
3 ' WES-CAN COLOR BOARD
4 ' 24HR BBS (403)-564-4118
5 '
6 ' NOT BAD FOR 5 LINES OF BASIC
7 '
10 DIMC(6,6):PLAY"T255":POKE6549
7,0:PALETTECMP:HBUFF1,1322:PALET
TE0,1:HCOLOR0,1:HSCREEN2:FORM=1T
O5:READX,Y,R,C,H,S,E:HCIRCLE(X,Y
),R,C,H,S,E:NEXT:HCOLOR1,0:FORX=
1TO6:HLINE(0,X)-(40,X),PSET:NEXT
:FORX=52TO44STEP-1:HLINE(0,X)-(4
0,X),PSET:NEXT:HCOLOR0,1
```

```
20 FORX=1TO5:READS,C:PALETTES,C:
NEXT:FORM=1TO5:READX,Y,C,B:HPAIN
T(X,Y),C,B:NEXT:HLINE(0,0)-(55,5
5),PSET,B:HPAINT(2,2):HLINE(0,19
)-(50,19),PSET:HLINE(0,31)-(50,3
1),PSET:FORM=1TO5:READX,Y,C,B:HP
AINT(X,Y),C,B:NEXT:HGET(0,0)-(52
,48),1:HCLS0
30 FORC=2TO6:FORT=2TO6:READC(C,T
):NEXT:NEXT:A=0:B=0:C=320:D=192:
FORX=2TO6:HCOLORX,0:FORY=1TO4:HL
INE(A,B)-(C,D),PSET,B:A=A+1:B=B+
1:C=C-1:D=D-1:NEXT:NEXT:X=18:Y=8
8:A=5:B=5:DATA25,25,20,0,1,0,1,3
3,25,22,0,1,.25,.75,17,25,22,0,1
,.75,.25,37,25,18,0,1.5
40 FORC=2TO6:FORS=2TO6:PALETTES,
C(C,S):NEXT:HPUT(X,Y)-(X+52,Y+48
),1:X=X+A:Y=Y+B:IFX>246THENX=246
:PLAY"5":A=-5:GOTO40ELSEIFX<20TH
ENX=20:A=5:PLAY"5":GOTO40ELSEIFY
>121THENY=121:PLAY"5":B=-5:GOTO4
0ELSEIFY<22THENY=22:PLAY"5":B=5:
GOTO40ELSENEXT:GOTO40
50 DATA .3,.65,13,25,18,0,1.5,.8
,.3,2,63,3,36,4,16,5,11,6,54,40,
25,2,0,33,25,3,0,25,25,4,0,17,25
,5,0,10,25,6,0,25,25,6,0,17,25,2
,0,10,25,3,0,40,25,4,0,33,25,5,0
,63,36,16,11,54,36,16,11,54,63,1
6,11,54,63,36,11,54,63,36,16,54,
63,36,16,11
```

CoCo 3

Two-Tone Text

By Edward Jones

Many of us who have had only a 32-column text screen with black characters on a green background are overwhelmed by the 64 background, border and text colors available with the CoCo 3. With this great assortment to choose from, it can be difficult to know which background colors to use with which border or text colors.

The following program operates in the 40-character width text screen and allows you to see what the 64 background colors really look like with any of the other 64 border colors and a variety of text colors. This can be handy when you want to select color combinations for a BASIC program or to find a combination to work with in either the 40- or 80-character screen.

The program menu will allow you to toggle through the background colors and to match the border to the background and try different text colors at any point. Many of the combinations are a relief from the old black and green text screen.

When you find a set of colors you like, you can break out of the program, enter `NEW` and then use them until you alter the colors again or turn off the computer.

The listing: COLORS

```
10 'COCO3 HI-RES TEXT SCREEN BOR
DER AND BACKGROUND COLOR SELECTO
R BY EDWARD JONES
20 WIDTH40:PALETTE0,0:PALETTE8,6
3:CLS1:X=-1:T=0:B=0
30 X=X+1:IFX=64THENX=0
40 PALETTE0,X
50 CLS:IF B>-1THENPRINT:PRINT" T
HE BORDER COLOR IS PALETTE 0,";B
60 PRINT:PRINT" THE BACKGROUND C
OLOR IS PALLET 0,";X:PRINT:PRINT
STRING$(40,61);:FORL=1TO2:PRINT:
NEXTL
70 PRINT"PRESS <G> TO GO TO NEXT
 BACKGROUND COLOR"
80 PRINT"PRESS (M> TO MATCH THE
BORDER COLOR TO":PRINT:PRINT"
       TO THE BACKGRKOUND COLOR"
90 PRINT:PRINT"PRESS <T> TO TOGG
LE LETTERING BETWEEN":PRINT:PRIN
T"          WHITE, BLACK, RED, G
REEN, BLUE"
100 PRINT"PRESS <Q> TO KILL THIS
 PROGRAM AND KEEP":PRINT:PRINT"
        THE CURRENT BACKGROUND,
 BORDER":PRINT"            AND TEX
T COLORS"
110 A$=INKEY$:IFA$=""THEN110
120 IFA$="M"THENB=X:CLS1:GOTO40
130 IFA$="G"THEN30
140 IFA$="T"THENGOSUB170
150 IF A$="Q"THEN CLS:NEW
160 GOTO110
170 IF T=0THENPALETTE8,0:T=36:RE
TURN
180 IF T=36THENPALETTE8,36:T=8:R
ETURN
185 IF T=8THENPALETTE8,8:T=20:RE
TURN
190 IF T=20THENPALETTE8,20:T=63:
RETURN
200 IF T=63THENPALETTE8,63:T=0:R
ETURN
```

Graphics

16K
ECB

Four Shades Of Gray

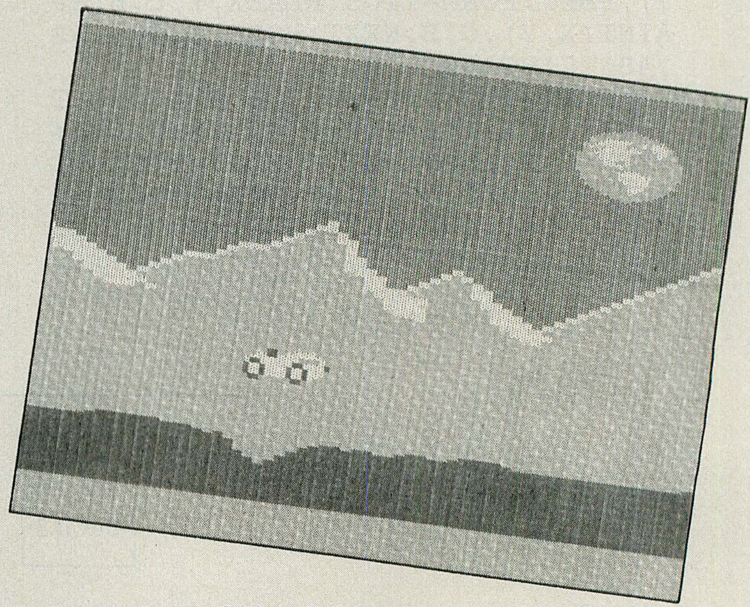
By Pierre Salvail

Color Dump prints graphics screens in PMODE 3 or PMODE 1. Each color on the screen is represented by a different color shading.

To perform a sceen dump, first make sure the image to be dumped is in memory. Then, simply load and run *Color Dump*. The computer asks you to select the PMODE and prompts you to choose the Gemini or SG-10 printer mode. After answering, the graphics screen will be displayed.

When you are sure the screen is what you want to dump, press any key. The computer will then display the gray scales available that can be printed on paper, and the word GREEN. Enter the number of the gray scale that will represent, on paper, the green color on the screen. Do the same for the yellow, blue and red colors. More than one screen color can have the same gray scale.

Make sure the printer is online, press any key and the graphics screen will be dumped to the printer in about 20 minutes.



Screen Dump Using *Color Dump*

The listing: COLRDUMP

```
10 '*****************************
20 '* SCREEN DUMP FOR GEMINI   *
30 '*  AND SG-10 PRINTERS IN   *
40 '*    PMODE 3 AND PMODE 1   *
50 '*           BY             *
60 '*      PIERRE SALVAIL      *
70 '*   95 CHARLOTTE, SOREL    *
80 '* QUEBEC, CANADA, J3P 1G7 *
90 '*****************************
100 CLS:PRINT:INPUT" PMODE";PM:I
FPM<>1 AND PM<>3 THEN RUN ELSE P
MODE PM,1
110 CLS:PRINT:PRINT" gEMINI 10X"
+CHR$(13)+" sG 10":GOSUB310:IFA$
="G"THENG$=CHR$(27)+"K"+CHR$(176
)+CHR$(1):SP=48:GOTO140
120 IF A$="S"THENG$=CHR$(27)+"g"
+CHR$(5)+CHR$(224)+CHR$(1):SP=96
:GOTO140
130 GOTO110
140 F(1)=2:F(3)=1
150 C1(1)=0:C2(1)=0
160 C1(2)=8:C2(2)=2
170 C1(3)=10:C2(3)=5
180 C1(4)=13:C2(4)=7
190 C1(5)=15:C2(5)=15
200 SCREEN1,0:GOSUB310
210 CLS:FORC=1TO5:READC$:PRINT@1
40+32*C,STR$(C);"- ";C$:NEXT
220 FORC=1TO4:READC$:PRINT@129,C
$;"=":GOSUB310:R(C)=VAL(A$):NEXT
230 PRINT@392,"PRESS ANY KEY":GO
SUB310:SCREEN1,0
240 PRINT#-2,CHR$(27);"A";CHR$(8
)
250 FORX=0TO255STEP4
260 PRINT#-2,G$;
270 FORS=1TO SP:PRINT#-2,CHR$(0)
;:NEXT
280 FORY=191TO0STEP-F(PM)
290 FORP=1TO F(PM):PRINT#-2,CHR$
(C1(R(PPOINT(X,Y)))*16 OR C1(R(P
POINT(X+2,Y))));CHR$(C2(R(PPOINT
(X,Y)))*16 OR C2(R(PPOINT(X+2,Y)
)));:NEXTP,Y:PRINT#-2:NEXTX
300 CLS:END
310 A$=INKEY$:IFA$=""THEN310ELSE
RETURN
320 DATA WHITE,LIGHT GRAY,GRAY,D
ARK GRAY,BLACK
330 DATA GREEN,YELLOW,BLUE,RED
```

4K

Library Labeler

By Alan L. Andrews

Cassette Box Labeler prints labels to fit in the clear end of cassette boxes. This allows you to see which tape is in the box without having to remove it from the shelf or holder.

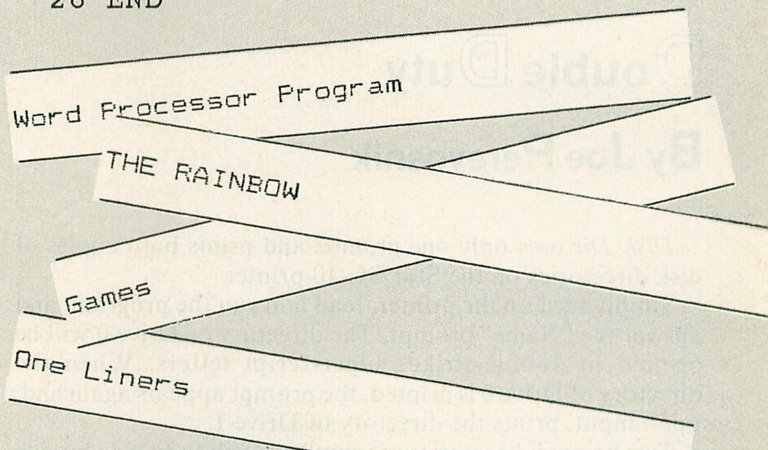
The program is set up to be used with a Star SG-10 printer, but different printer codes can be substituted. Line 10 is the baud poke, lines 12 and 13 set the left and right margins, and Line 14 sets the printer for emphasized print.

The program first asks for the information you want printed. The input can be no longer than 38 spaces. To change the pause, edit the `T=1` in Line 17. Lines 22 through 25 reset the printer.

The printed lines are guides for cutting and should be as long as the cassette box is wide.

The listing: `CASBXLBL`

```
0 'CASBXLBL/UTL
1 '<<<<<<<<<<<<<<+>>>>>>>>>>>>>>
2 '<<<  CASSETTE BOX LABELS  >>>
3 '<<<   PRINTING  UTILITY   >>>
4 '<<< DEVELOPED & PROGRAMED >>>
5 '<<<          BY           >>>
6 '<<<    ALAN L. ANDREWS    >>>
7 '<<<   (THE LONE COYOTE)   >>>
8 '<<<<<<<<<<<<<<+>>>>>>>>>>>>>>
10 POKE 150,1
11 ESC$=CHR$(27)
12 PRINT#-2,ESC$"M"CHR$(0);
13 PRINT#-2,ESC$"Q"CHR$(39);
14 PRINT#-2,ESC$"E";
15 FOR X=1 TO 38:PRINT#-2,CHR$(9
5);:NEXT
16 CLS(8):SOUND 50,2:INPUT"WHAT
DO YOU WANT TO PRINT ON THE CASS
ETTE BOX LABEL";A$
17 IF LEN(A$)>38 THEN PRINT@128,
"YOU ONLY HAVE 38 SPACES.";:SOUN
D 1,3:FOR T=1 TO 3000:NEXT T:GOT
O 16
18 PRINT#-2:PRINT#-2:PRINT#-2,A$
19 CLS(2):INPUT"DO YOU WANT TO P
RINT ANOTHER (Y/N)";B$
20 IF B$="Y" OR B$="y" THEN GOTO
 15
21 CLS:FOR X=1 TO 38:PRINT#-2,CH
R$(95);:NEXT
22 PRINT#-2,CHR$(13)
23 PRINT#-2,ESC$"M"CHR$(0)
24 PRINT#-2,ESC$"Q"CHR$(80)
25 PRINT#-2,ESC$"F"
26 END
```



Sample Printout

4K

Sized To Fit

By Forrest K. White

Listing Formatter will set up a Gemini 10X or compatible printer to print listings in a 32-, 40-, or 80-column mode and will skip over perforations on longer listings.

With your printer on and online, load and run the program. Then load the program that you want a printed listing of, select the format and type `LLIST`.

The listing: `FORMATTR`

```
10 CLS
20 REM WIDTH 32 REM DELETE FIRST
 REM FOR COCO 3
30 REM PRTSETUP BY
        FORREST K. WHITE
        BOX 535
        RIVERVIEW AL.
              36872
40 INPUT"DO YOU WANT  (1)32 COL M
ODE                   (2)40 COL M
ODE                   (3)80 COL M
ODE";X
```

```
50 IF X=1 THEN Y=32
60 IF X=2 THEN Y=40
70 IF X=3 THEN Y=80
80 PRINT"THIS WILL SET THE GEMIN
I 10X    PRINTER TO PRINT IN A";
Y;"COLUMN MODE"
90 PRINT
100 PRINT"RUN THIS PROGRAM WITH
THE         PRINTER TURNED ON THEN
 WITHOUT  TURNING OFF THE PRINTE
R LOAD ANDLLIST THE PROGRAM THAT
 YOU WANT TO SEE IN";Y"COLUMN MO
DE"
110 PRINT"TYPE ANY KEY TO CONTIN
UE"
120 IF INKEY$=""THEN 120
130 CLS
140 PRINT#-2,CHR$(27)CHR$(78)CHR
$(6)' SET AND ENABLE SKIP-OVER P
ERF-  ORATION FEATURE
150 PRINT#-2,CHR$(27)CHR$(82)CHR
$(6)'CHANGE THE LOCATION OF HEAD
ER    (FIRST LINE OF FORM)
160 IF X=3 THEN 220
170 PRINT#-2,CHR$(27)CHR$(77)CHR
$(6)'SET THE LEFT HAND PRINT   M
ARGIN
180 IFX=2 THEN 210
190 PRINT#-2,CHR$(27)CHR$(81)CHR
$(37)'SET THE RIGHT HAND PRINT M
ARGIN
200 GOTO 220
210 PRINT#-2,CHR$(27)CHR$(81)CHR
$(45)'SET AND ENABLE THE RIGHT
 HAND MARGIN FOR 40 COL PRINT
220 PRINT"YOU ARE NOW READY TO L
OAD OR    CLOAD ANY BASIC PROGRA
M THAT     YOU WANT PRINTED IN";Y
;"COLUMN    FORMAT"
```

16K Disk

Double Duty

By Joe Perevosnik

Disk Dir uses only one granule and prints hard copies of disk directories on the Star SG-10 printer.

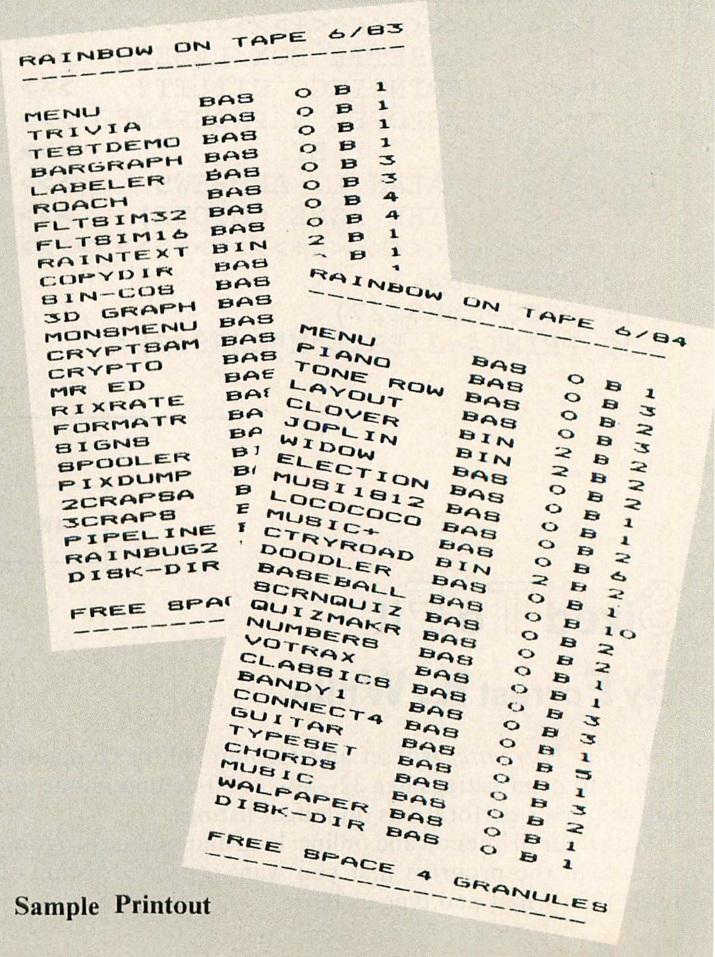
Simply turn on the printer, load and run the program, and answer the "Name" prompt. The directory of Drive 0 will be printed in double-strike, super-script letters. When the directory of Drive 0 is printed, the prompt appears again and, upon input, prints the directory of Drive 1.

Two printed directories are small enough to fit side by side on the front of a disk jacket and can be cut and taped to the front of the jacket.

Perhaps this program will help keep some order in your disk collection.

The listing: DISK DIR

```
10 PRINT#-2,CHR$(27)"A"CHR$(7):P
RINT#-2,CHR$(27)"G":PRINT#-2,CHR
$(27)"E":PRINT#-2,CHR$(27)"S"CHR
$(0)
20 PRINT#-2:INPUT"DISK NAME";X$:
PRINT#-2,X$:PRINT#-2,"----------
----------":POKE111,254:DIR:PRIN
T#-2:PRINT#-2,"FREE SPACE"FREE(0
)"GRANULES":PRINT#-2,"----------
-----------":PRINT#-2:PRINT#-2
30 PRINT#-2:INPUT"DISK NAME";X$:
PRINT#-2,X$:PRINT#-2,"----------
---------":POKE111,254:DIR(1):PR
INT#-2:PRINT#-2,"FREE SPACE"FREE
(1)"GRANULES":PRINT#-2,"--------
------------":GOTO20
```



```
RAINBOW ON TAPE 6/83
--------------------
MENU      BAS  0 B 1
TRIVIA    BAS  0 B 1
TESTDEMO  BAS  0 B 1
BARGRAPH  BAS  0 B 1
LABELER   BAS  0 B 3
ROACH     BAS  0 B 3
FLTSIM32  BAS  0 B 4
FLTSIM16  BAS  0 B 4
RAINTEXT  BIN  2 B 1
COPYDIR   BAS
SIN-COS   BAS
3D GRAPH  BAS
MONSMENU  BAS
CRYPTSAM  BAS
CRYPTO    BAS
MR ED     BA
RIXRATE   BA
FORMATR   BA
SIGNS     BA
SPOOLER   B
PIXDUMP   B
2CRAPSA   B
3CRAPS
PIPELINE
RAINBUG2
DISK-DIR

FREE SPA
--------
```

```
RAINBOW ON TAPE 6/84
--------------------
MENU      BAS  0 B 1
PIANO     BAS  0 B 3
TONE ROW  BAS  0 B 2
LAYOUT    BAS  0 B 3
CLOVER    BIN  2 B 2
JOPLIN    BIN  2 B 2
WIDOW     BAS  0 B 2
ELECTION  BAS  0 B 1
MUSI1812  BAS  0 B 1
LOCOCOCO  BAS  0 B 2
MUSIC+    BAS  0 B 6
CTRYROAD  BIN  2 B 2
DOODLER   BAS  0 B 1
BASEBALL  BAS  0 B 10
SCRNQUIZ  BAS  0 B 2
QUIZMAKR  BAS  0 B 2
NUMBERS   BAS  0 B 1
VOTRAX    BAS  0 B 1
CLASSICS  BAS  0 B 3
BANDY1    BAS  0 B 3
CONNECT4  BAS  0 B 1
GUITAR    BAS  0 B 5
TYPESET   BAS  0 B 1
CHORDS    BAS  0 B 3
MUSIC     BAS  0 B 2
WALPAPER  BAS  0 B 1
DISK-DIR  BAS  0 B 1
FREE SPACE 4 GRANULES
--------------------
```

Sample Printout

4K

Printing With Style

By Blake C. Hughes

Print Font prints 10 different styles on a Tandy DMP-105 printer. Select a style and you are ready to print with your favorite program or word processor.

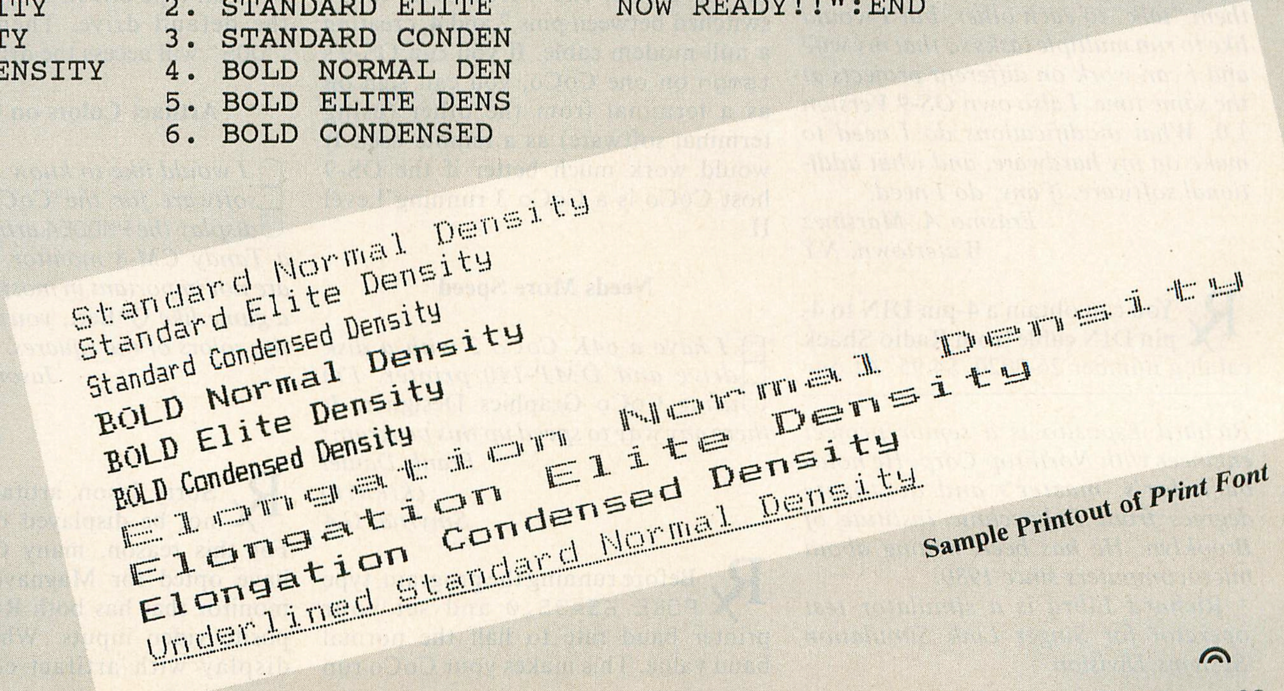
If you would like a hard copy of each style, simply add the following line after running the program:

```
330 PRINT"WHAT STYLE ARE YOU SAM
PLING?":LINEINPUTI$:PRINT#-2,I$:
GOTO10
```

It is not necessary to clear the printer buffer when changing styles. The buffer is automatically cleared of any existing printer codes each time a new style is selected.

The listing: PRNTFONT

```
10 ' DMP-105
20 ' BY BLAKE C. HUGHES
30 ' 5210 GLANCY DR.
40 ' CARMICHAEL, CA 95608
50 '
60 PRINT#-2,CHR$(14);CHR$(27);CH
R$(15);CHR$(27);CHR$(32);CHR$(27
);CHR$(19);:UN=1:GOTO80
70 CLS:PRINT:PRINT"  CHOOSE A ST
YLE TO UNDERLINE":GOTO90
80 CLS:PRINT:PRINT"    SELECT A
STYLE OF PRINT"
90 PRINT@96," 1. STANDARD NORMAL
 DENSITY     2. STANDARD ELITE
DENSITY      3. STANDARD CONDEN
SED DENSITY  4. BOLD NORMAL DEN
SITY         5. BOLD ELITE DENS
ITY          6. BOLD CONDENSED
DENSITY"
100 PRINT" 7. ELONGATION NORMAL
DENSITY    8. ELONGATION ELITE D
ENSITY     9. ELONGATION CONDENS
E DENSITY"
110 IF UN=1 THEN PRINT"10. UNDER
LINE"
120 INPUT C$
130 IF C$="1" THEN 230
140 IF C$="2" THEN 240
150 IF C$="3" THEN 250
160 IF C$="4" THEN 260
170 IF C$="5" THEN 270
180 IF C$="6" THEN 280
190 IF C$="7" THEN 290
200 IF C$="8" THEN 300
210 IF C$="9" THEN 310
220 IF C$="10" THEN 320 ELSE80
230 GOSUB330
240 PRINT#-2,CHR$(27);CHR$(23);:
GOSUB330
250 PRINT#-2,CHR$(27);CHR$(20);:
GOSUB330
260 PRINT#-2,CHR$(27);CHR$(31);:
GOSUB330
270 PRINT#-2,CHR$(27);CHR$(31);C
HR$(27);CHR$(23);:GOSUB330
280 PRINT#-2,CHR$(27);CHR$(31);C
HR$(27);CHR$(20);:GOSUB330
290 PRINT#-2,CHR$(27);CHR$(14);:
GOSUB330
300 PRINT#-2,CHR$(27);CHR$(14);C
HR$(27);CHR$(23);:GOSUB330
310 PRINT#-2,CHR$(27);CHR$(14);C
HR$(27);CHR$(20);:GOSUB330
320 PRINT#-2,CHR$(15);:UN=0:GOTO
70
330 CLS:PRINT"  YOUR PRINTER IS
NOW READY!!":END
```



Standard Normal Density
Standard Elite Density
Standard Condensed Density
BOLD Normal Density
BOLD Elite Density
BOLD Condensed Density
Elongation Normal Density
Elongation Elite Density
Elongation Condensed Density
Underlined Standard Normal Density

Sample Printout of *Print Font*

The Price is Right and Upgrade Looks Easy

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Can I use a TEAC FD-54A SSDD 40-track, half-height disk drive as Drive 1 on my FD 501? These are available for about $50, and the upgrade looks easy enough to do myself.

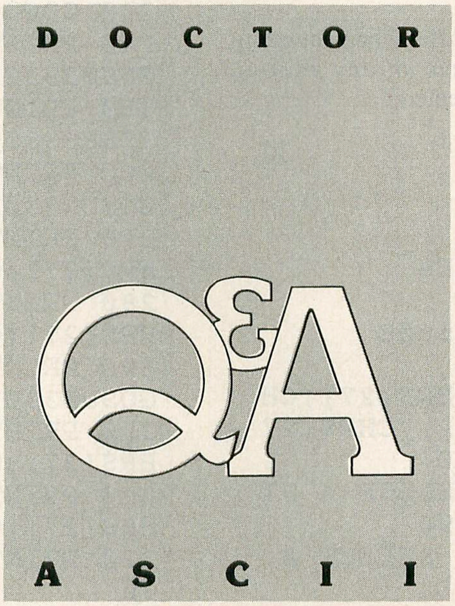
Michael J. Keyes
(MIKEYES)
Wichita, KS

℞ Any half-height drive that is IBM PC-compatible will do the job, although, due to the orientation of the edge connector, with some drives you may need a new cable.

Remote Terminals

I own a CoCo 1 and a CoCo 2 and would like to know how to use one of them as a remote terminal in my home. I know that running a terminal program on both computers will make them "talk" to each other, but I would like to run multiple tasks so that my wife and I can work on different projects at the same time. I also own OS-9 Version 1.0. What modifications do I need to make on my hardware, and what additional software, if any, do I need?

Erasmo A. Martinez
Watertown, NY



℞ You can obtain a 4-pin DIN to 4-pin DIN cable from Radio Shack catalog number 26-3020, $4.95. At one of the DINs, the wires need to be switched between pins 2 and 4, creating a null-modem cable. If you run OS-9's `tsmon` on one CoCo, you can sign on as a terminal from the other (using terminal software) as a remote user. It would work much better if the OS-9 host CoCo is a CoCo 3 running Level II.

Needs More Speed

I have a 64K CoCo 2 with a disk drive and DMP-110 printer. I'm using CoCo Graphics Designer. *Is there any way to speed up this program?*

Frank Daniel
(KIRBYE)
Smyrna, GA

℞ Before running the program, type `POKE 65495,0` and set your printer baud rate to half the normal baud value. This makes your CoCo run at double speed when in ROM. To return to normal speed, type `POKE 65494,0`.

Booting DOS From Drive 1

How can DOS programs be run from Drive 1? I have tried `RUN DOS:1` *and Drive 1 starts the boot routine, but Drive 0 kicks in to complete the operation. I have also tried using Drive 1 as the system default, but it does not help.*

Rick Pochervina
(RAPOC)
Wickliffe, OH

℞ As long as the drive number is not hard-coded into the software, you can type `DRIVE 1` making Drive 1 the default drive. Then typing `RUN "DOS"` will access the drive you want.

Artifact Colors on CoCo 3

I would like to know if there is any software for the CoCo 3 that will display the `PMODE4` *artifact colors on a Tandy CM-8 monitor. These colors are not important in most games but, in a game like* Q*Bert, *you need to know the colors of the squares.*

Jason B. Ruddock
(JAYR)
Montville, NJ

℞ Sorry Jason, artifact colors cannot be displayed on the CM-8. For this reason, many CoCo 3 users have opted for Magnavox's 8CM515 monitor that has both RGB and composite video inputs. When viewing a display with artifact colors on the

---

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

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- Automatic Directory Backup*
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- Basic Program Autostart for cassette
- Base converter
- Basic Program Line Copy Utility
- Basic Search
- Bowling Score Keeper
- Calendar Maker (DMP Printers)
- Cassette Label Maker (DMP Printers)
- Clock for Programming
- Computerized Checkbook
- CoCo Base (different CoCo Products)
- CoCo Calculator
- Design your own Commands
- Disk Cataloger
- Basic Program Encryptor
- Disk Label Maker
- DMP Character Set Editor
- DMP Superscripts
- Enhanced Basic *
- Enhanced KILL
- Enhanced TRON/TROFF
- Error Locator
- Fast Sort for Basic Strings
- Function Keys
- Gemini/Epson Graphics Dump
- Gradebook for teachers
- Graphics Compression
- Graphics Lettering (2 sizes)
- Graphics Shifter
- Graphics Screen Zoom
- Home Bill Manager
- IO Data Monitor
- Inverse Highlighting
- Keystroke Saver
- Large DMP Graphics Dump
- Last Command Repeater
- Line Cross Reference
- LIST/DIR Pause
- Mailing List (Disk Only)
- ML/Basic Merge
- Memory Monitor
- Message Animator
- Metric Conversions
- ML to DATA Convertor
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- ON BREAK GOTO command
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All programs available on disk only. More than one program will be sent on the same disk. Documentation included. Please add $1.00 S&H. NYS residents add sales tax. All programs compatible with CoCo 1,2,3. Programs marked with * are compatible with CoCo 1 & 2 only.

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Magnavox, you simply select the composite input. With the CM-8, the code can be patched to use `PMODE3` instead of `PMODE4`, which will return the colors, but with some loss of detail.

Editor's note: A new product just released from Spectrum Projects, *RGB Patch*, will allow many programs that show up in black and white on a CM-8 to be displayed in color. However, it *will not work* for ROM packs, programs that run under OS-9 or BASIC programs. It *will run* with many machine language programs, including some with copy protection schemes.

Terminal Communications

I own a CoCo, a TRS-80 Modem II and Color Connection III *terminal software. My son owns a Commodore. I'm not sure what he's using for a modem or terminal software. Is it possible for us to communiate via our terminals even though we don't have the same type of equipment?*

Joseph R. Lavallee
(BAKERMAN)
Carrollton, TX

℞ You need to obtain smart terminal software for both machines and a null-modem cable (see answer to Erasmo Martinez) to interconnect the two machines.

CoCo Util Upgrade

I have recently purchased a CoCo 3. I'm experiencing difficulty with Spectrum Projects' CoCo Disk Utility *Version 2.1A. It seems to lock up when the opening menu is displayed. Can you suggest a fix? Also, I'm interested in using OS-9 Level II on my CoCo 3. What are the best drives for such a system that remain operational even with RS-DOS and my old CoCo 1-3 software?*

Alan J. Weston
(HEADLY)
Carterville, IL

℞ Spectrum Projects markets an upgrade for your version of *CoCo Util*; see their ad for details. For maximum versatility and reliability, get two half-height, 40-track, double-sided drives.

A *Joker Poker* Fix

Joker Poker, *March 1987, does not work on my CoCo 3. The cards are displayed on the screen, then this message appears:* `erno 26 erlin 13 did you enter, 'F$="SCORES":GOTO 2125; to establish scores?` *I've tried calling the author and have received no answer. Help!*

Leonard J. Petty
(WESTINGHOUSE)
Danville, CA

℞ The author intended for you to type `F$="SCORES":GOTO 2125` before running the game for the first time, as lines 2125-2130 will then create a file named `SCORES` that is necessary for proper operation of the program. Note, there must be space available on an unprotected disk in Drive 0 to establish the `SCORES` file.

CoCo to Leading Edge Connection

In addition to my first computer, a 16K CoCo upgraded to 64K, I now have an IBM clone, a Leading Edge 640K. In an effort to put some of my old CoCo tape files onto an LE disk, my son tried to make a direct connection from the CoCo's serial port to the serial port of the LE. He carefully established the pin configurations of an RS-232 connector for the LE and the 4-pin CoCo printer output port, and then he connected the two computers. Since direct connections did not work, he finally tapped into the data contacts of my Botek CCP-1 serial interface. He plugged the interface into the CoCo and a printer (the printer remained off), and connected two wires to the LE RS-232 from two signal contacts on the Botek. I was able to put a file from a CoCo tape cartridge into the CoCo, then `PRINT` *from the CoCo to the LE, and finally save the program on LE disk. My question is this: What conditions have to be present on the carrier detect pin in order to continue sending data to the printer board? Whatever those conditions are, Botek obviously meets them, while a direct connection does not. Also, why, when the transfer of data was made, was there such a proliferation of carriage returns? Every two or three words had a carriage return after them. I had expected a loss of text form because of the differences in text-structuring signals, but I cannot understand the addition of the CRs. Lastly, why did the transfer work on my* Telewriter 64 *files and for a taped ASCII file, but not for* CoCo Scripsit *files?*

David O. Winfrey
Smithsburg, MD

℞ To make a null modem to connect the two computers, refer to figures 1 and 2 below:

Short pins 4 (RTS) and 5 (CTS) on the DB-25.
Short pins 6 (DSR) and 20 (DTR) on the DB-25.
Join Pin 1 (TXR) of DIN with Pin 3 (RXR) of DB-25.
Join Pin 2 (GND) of DIN with Pin 7 (GND) of DB-25.
Join Pin 3 (RXR) of DIN with Pin 2 (TXR) of DB-25.
Join Pin 4 (CD) of DIN with Pin 8 (CD) of DB-25.

```
-------------------------------------------------
\  13 12 11 10  9  8  7  6  5  4  3  2  1 /
 \                                        /
  \  25 24 23 22 21 20 19 18 17 16 15 14 /
   ---------------------------------------
```

Figure 1: DB-25 Plug for IBM-PC Clone (cable side away from you)

```
      U
  4       1
  3       2
```

Figure 2: 4-Pin DIN on CoCo (cable side away from you)

To transfer files using this cable, use a smart modem program similarly configured on both machines. The IBM-PC and clones terminate each line of an ASCII file with CR LF while the CoCo terminates each line with CR only. So, if you list a file copied from a PC, it will come out double-spaced unless you filter out the LFs.

A regular save from *Scripsit* uses its own special disk format. If you want to generate a normal (thus transferable) file, use the Print to Disk option in *Scripsit*.

Spectaculator Help

Regarding Spectaculator *in your November column, can I change the print width in the ROM packs/tape version? If so, when do I enter the patch if the ROM packs must be loaded with the CoCo off? Can I make it print at 9600 baud?*

Bill Condie
Freehold, NJ

℞ To print at 9600 baud, put a piece of tape over the cartridge detect land (#8) of the ROM packs. With this line disabled, you can `POKE 150,1` for 9600 baud and then `EXEC $HC000` to run the program. To change the print width, you need to change the value in $D0AF to 1 plus your desired print width. Unfortunately, this address is normally in ROM, so you will need to make either a new ROM with the corrected value or run it from RAM. If running from RAM, *Spectaculator* is one of those "problem" ROM packs that needs to be fixed to run in RAM.

Nothing but Garbage

Every once in a while, I'll load something from tape, and it'll be nothing but garbage; I wait 15 minutes and it loads fine. The time of day, location or length of time that my CoCo has been on doesn't seem to make any difference. There must be something that I can do to counteract this. Do you have any ideas?

Norman Gruff
Dallas, TX

℞ You did not say, but if you have an 'F' board (PC board serial number ending in 285 or NC) CoCo 1 with overheating problems, secure a copy of RS Technical Bulletin CC:20. It gives instructions on installing a logic board (AX-7089), an SN74LS12, and an SN74LS393 to solve the problem. If the problem is only with specific tapes, try loading the tape with the recorder upside down. This puts the tape in a slightly different orientation with respect to the head and might help an otherwise unloadable tape to be read.

RS-232 Downloads

I have a 64K CoCo 1 with a Multi-Pak interface, single-sided disk drive, a 1.1 Radio Shack controller, and a Deluxe RS-232 Program Pak with a model 1B modem. How can I transfer a program from the RS-232 Program Pak to the disk drive without `CLOAD`*ing to tape? Even following instructions in the Multi-Pak manual doesn't seem to work.*

Charles Di Martino
Conshohocken, PA

The RS-232 pack, in itself, is incapable of reliably downloading programs from information networks and BBSs. To download using the RS-232 pack requires that you use a third-party terminal program with XON/XOFF protocol such as *Autoterm* from PXE Computing, *DataPak II* from Cer-Comp, *Color Connection* from Computerware, or one of the public domain terminal programs such as *MikeyTerm* or *Greg-E-Term*.

Peeking at the Printer

The `ON BRK` *on my CoCo 3 is very helpful, but how can I tell from* BASIC *if the printer is ready before using it? The* `BREAK` *command will not break a* `PRINT#-2` *that is waiting for the printer. I want to connect my CoCo 3 to a printer that has an RS-232 input. Does the CoCo 3 use the DTR or the XON/XOFF protocol?*

Mike Chambreau
Los Altos, CA

℞ To check if the printer is online, try `AND`ing the value at the decimal address 65314 with 1. If the result is 0, then the printer is online. If the

Hint . . .

A Minor Adjustment

I/O Errors encountered when using a tape system on your CoCo are quite frustrating. There are so many places for these errors to occur. Similarly, there are a thousand techniques for solving them. I found one that works 99 percent of the time. Use a small Phillips head jeweler's screwdriver to adjust the head azimuth of the playback head.

First, disconnect the recorder from the CoCo, set the volume to a comfortable level and play the tape. On the CTR-80 and CTR-81, you will find a small hole near the Radio Shack name on the front panel. There is a small screw in this hole. For the CCR-82, the screw is just to the left of the playback head in the tape compartment.

Now, turn the screw slowly from side to side while listening to the tape. Adjust the screw until you hear the clearest, crispest sound possible. This is the point at which your tape has the best chance of loading. Keep in mind, you will probably have to re-adjust the screw for other tapes. However, it isn't that much of a hassle in comparison with the I/O Errors.

Michael Nellis
Royal Oak, MI

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result is 1, the printer is not online. A typical routine might look like this:

```
10 IF PEEK(65314)AND1 = 0
THEN 30
20 PRINT"TURN PRINTER ON!!"
:GOTO10
30 program continues here
```

The Color Computer uses the DTR signal from the printer's RS-232 port to tell the computer when the print buffer is full. No character processing is done as is the case in a system using XON/XOFF.

A VIP Solution

It was almost two years ago that I purchased VIP Speller *from Softlaw. I had hoped to use it with my* Scriptsit *program but, needless to say, it never worked properly. For extremely short documents, it worked correctly. However, longer documents would simply disappear toward the end of the document. I have called Softlaw [now VIP Technologies] and was told it should work, but the fact remains that it doesn't. I think I know why, however. All saves in* Scriptsit *are in binary, and* VIP Speller *is looking for the ASCII files. Is there any way of converting these binary files to ASCII code files?*

Richard Zawatzke
Racine, WI

℞ The *Scripsit* program does save text files in a strange combination of binary and ASCII. VIP packages also use a strange format for their ASCII saves. These differences are causing problems. I have found that a text file saved to disk from *Scripsit* can be read into *VIP Writer* with no problems. If that file is then resaved, it will work correctly with *VIP Speller.*

Carriage Adjustments

I have a problem with my Radio Shack Line Printer VIII (Catalog No. 26-1168) that only shows up in the data processing mode. If I attempt to `LLIST` *a program, any time the printer encounters a line with more than 80 characters, the carriage stops at the extreme right and the alert LED light comes on. If I press the reset button, the carriage returns to the left and begins printing, but some data is lost. If I try the self test at power up, a similar thing happens after printing only one line of characters. When attempting to print a report on a* Pro-Color *file, this also occurs. The printer works fine for word processing with* VIP Writer *or when in the graphics mode for printing pictures from* CoCo Max. *Can you tell me what might be wrong and how I can fix it?*

Mark Fields
Troy, OH

℞ It sounds as if the carriage is improperly set on your LP-VIII. This could be due to age, but most likely it is because you have recently moved the carriage. The print head may be trying to print the 80 characters that the printer logic is telling it to. However, the print head is starting too far to the right. When it gets out to the end of the line, it runs out of room and gets stuck against the stop on the print head guide. This will cause the alert light to come on. Make sure the print head is as far to the left as possible before printing. This should happen automatically when the printer is turned on; however, age can alter this.

Lack of Underlines

I have an unusual problem with my word processing program, VIP Writer. *When I send my output to my printer, a Smith-Corona L-1000 daisy wheel, I cannot get any words underlined. I've tried all of the program's underlining procedures and changing the printer's ASCII formats, but still cannot get the underlining function of my printer to operate. Do you have any suggestions?*

Randall Berkland
San Francisco, CA

℞ Most printers have a specific control code or control sequence to designate underlining printing. This is usually in the form of `ESCAPE`*##*. Some cases may not require the escape character. You should first consult your printer manual for the proper code to tell the L-1000 to underline, then set up a special printer driver as explained in the *VIP Writer* manual. The default driver in the *Writer* program is for a DMP-200. The manual explains how to alter this driver.

Model 100 — CoCo Tape Transfers

I have some cassettes for a TRS-80 Model 100 portable computer and have tried to load them into my CoCo by poking values into locations 143, 144 and 145, but to no avail. Can you offer any guidance?

Harold Luck
Jacksonville, AR

℞ In reference to the two figures in answer to David Winfrey's question, you can build a null-modem cable as below:

DB-25 Pin		DIN Pin
2	<------->	3
3	<------->	1
7	<------->	2
20	<------->	4

Then with a smart terminal program in the Model 100, you can transfer ASCII-saved BASIC programs and text files between the two machines.

No Negative Voltages Here

What are the voltages found on pins 1, 2, 3 and 4 on the socket numbered CN-2 on a Radio Shack disk drive? I thought that the disk drive needed +5, +12 and -12 volts. Is this true?

Michael Smith
Colorado Springs, CO

℞ The connector that you refer to on your Radio Shack disk drive is connected to the power supply as follows:

Pin 1 = +12 volts
Pin 2 = +12 volt ground
Pin 3 = +5 volt ground
Pin 4 = +5 volts

The disk drive does not require -12 volts for operation, just +5 and +12 volts.

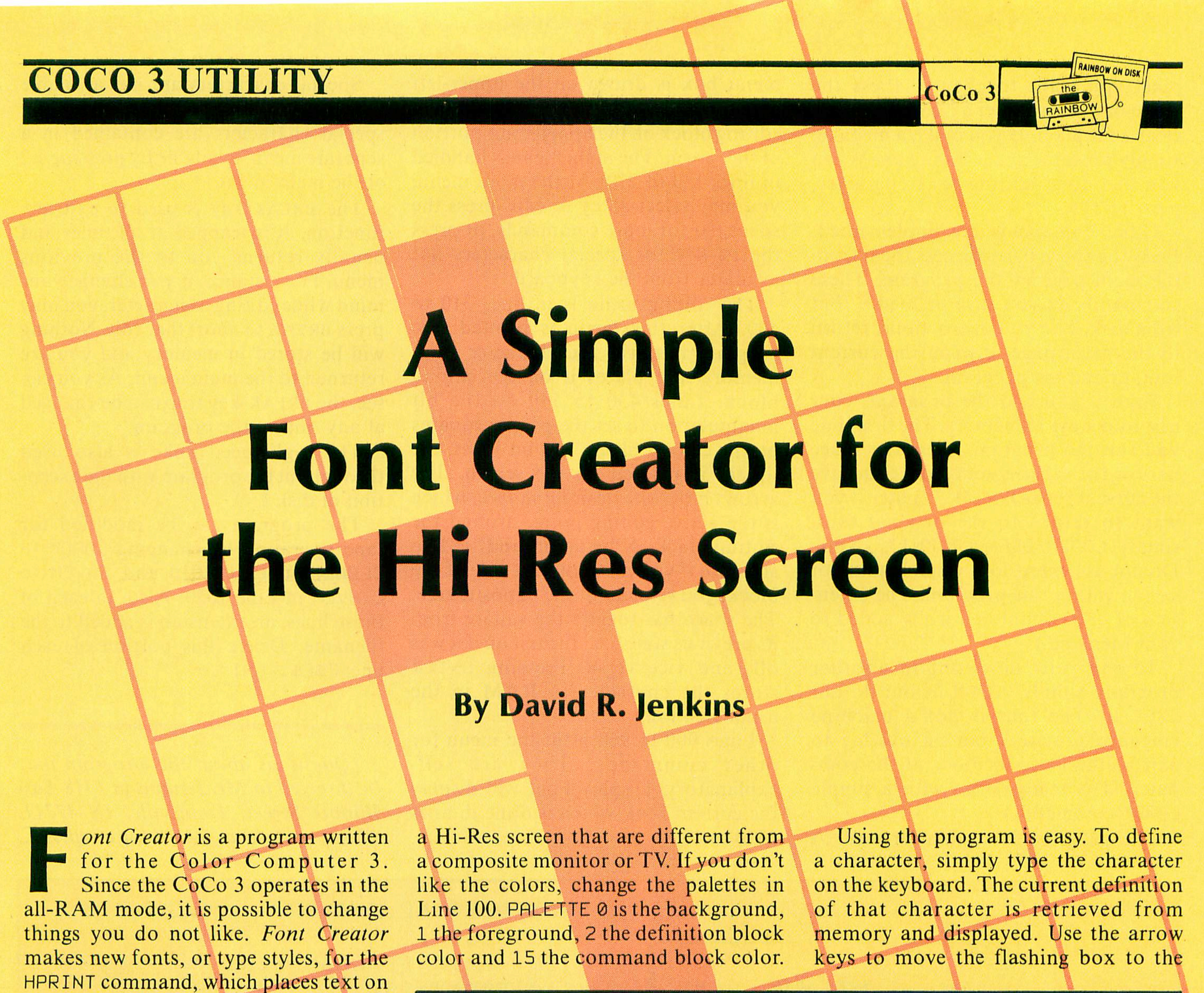
CoCo 3 Service Manual

Where can I get a technical service manual for my CoCo 3?

David Rogers
Columbia, MD

℞ Order part #MS 260-3334, $15.60, through your local Radio Shack dealer from Radio Shack national parts.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.



A Simple Font Creator for the Hi-Res Screen

By David R. Jenkins

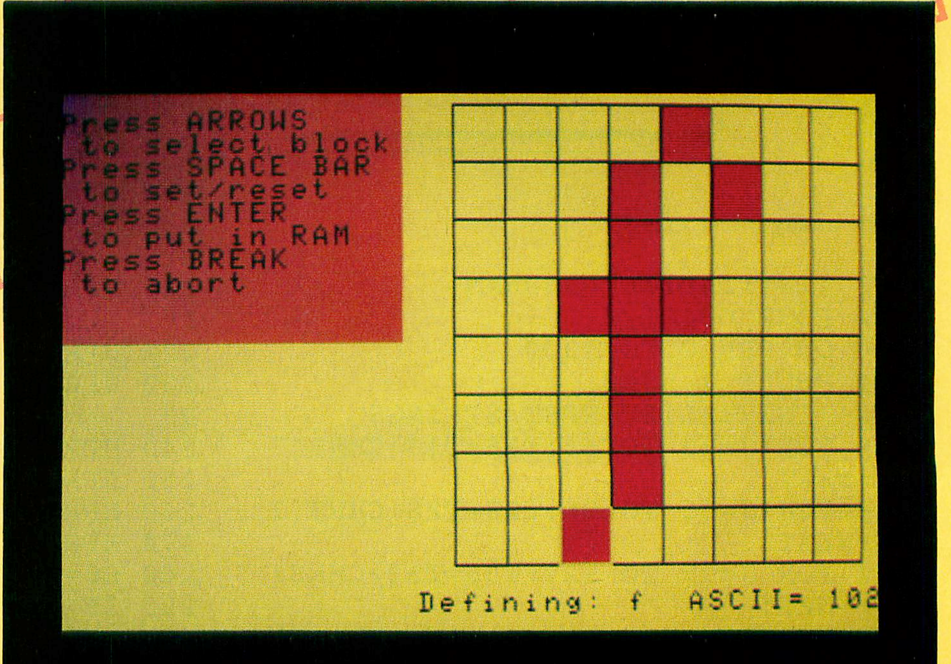
Font Creator is a program written for the Color Computer 3. Since the CoCo 3 operates in the all-RAM mode, it is possible to change things you do not like. *Font Creator* makes new fonts, or type styles, for the `HPRINT` command, which places text on the high resolution text screens. My program was inspired by an alternate type font created by Andre Boivin.

The font you create is saved to a disk file that can be loaded like any binary file with the `LOADM` command. It is even possible to mix fonts by loading a font, printing to the Hi-Res screen, loading another font and printing more.

The Hi-Res font resides in addresses 61605 through 62364. Each character consists of eight bytes. Each byte controls eight pixels on one line. A high bit sets a pixel and a low bit clears a pixel. *Font Creator* manipulates these bits, saves them to memory and saves them to disk for later use.

The program contains remarks that define the operation of each section. The program was designed using the RGB monitor which creates colors on a Hi-Res screen that are different from a composite monitor or TV. If you don't like the colors, change the palettes in Line 100. `PALETTE 0` is the background, 1 the foreground, 2 the definition block color and 15 the command block color.

Using the program is easy. To define a character, simply type the character on the keyboard. The current definition of that character is retrieved from memory and displayed. Use the arrow keys to move the flashing box to the



```
Press ARROWS
 to select block
Press SPACE BAR
 to set/reset
Press ENTER
 to put in RAM
Press BREAK
 to abort

Defining: f  ASCII= 102
```

This photograph shows the Font Creator's *"edit" screen. Available commands are indicated in the upper left corner.*

Dave Jenkins is an engineer at WNIN FM/TV in Evansville, Indiana, and has been using his Color Computers for six years.

pixel you want to change. Press the space bar to either set a cleared pixel or clear a set pixel. If you make a mistake, simply press the space bar again. When you are done editing that character, press ENTER.

Other commands are implemented. Press the space bar to access them from the main page of the program. These commands let you save or load a font from disk, give you instructions, return to the main page, display the current font, or end the program.

Even if you end the program, your new font stays in memory. The first time you run the program, press the space bar for the other commands, then save the current set as `DEFAULT`. Later if you want to return to the original font, simply `LOADM"DEFAULT.FNT"`. (Note: Do not use extensions when loading or saving within this program. The extension of `.FNT` is automatically added to your filename.)

To use your new font in another program, simply `LOADM` it, but do not `EXEC` it! The font is not a machine language program, but an overlay to part of the basic memory of the computer. It is ready to go with a simple `LOADM` command.

The program is straightforward. A menu box is drawn on the upper-left corner of the graphics screen, and an editing block on the upper-right portion of the screen. The main menu is handled in lines 130 to 270. At the main menu, you may select a key to edit, press the space bar for more commands, or press the F2 key for special characters not available from the keyboard.

The editing menu is in lines 310 to 400. After this menu is printed, the program retrieves the character from memory and places it on the editing block. Lines 430 to 540 do the bit manipulation to set the proper squares on the editing block. If a bit is set, the square is painted on the screen. The arrows move the flashing square, which is the active editing point, around the editing block. A "wrap-around" is also active so if you move off one side of the block, you re-enter at the opposite side. The space bar toggles the square from its previous state, i.e., turns it on if it was off, and vice versa. Pressing ENTER stores the character in RAM in the usual location.

Lines 900 to 960 print the menu for other commands. They are self-explanatory. Display Font will display the current font, which is done in lines 1310 to 1350.

Special characters are not available directly from the keyboard. These special characters are contained in a separate menu, available by pressing F2 at the main menu.

The BREAK key is used to exit any function. It is trapped at all times and usually returns you to the previous menu. For instance, if you change your mind while editing a character, you may press BREAK to abort that edit. Nothing will be stored in memory and you are returned to the main menu. As you can see, the BREAK-key trap can be changed at any time in the program.

The high-speed poke is also used throughout the program with the exception of disk I/O.

The program can be modified for tape operation by changing `LOADM` to `CLOADM` in Line 1010 and `SAVEM` to `CSAVEM` in Line 1020. Also, in each of those lines, an extension is added to the filename. Delete this portion of each line: `F$F$."FNT"`.

(Questions about this program may be directed to Mr. Jenkins at 1418 East Illinois Street, Evansville, IN 47711. Please enclose an SASE for a reply.) ☐

220	137	1010	82
420	16	1120	8
590	181	1330	119
800	185	END	87

The listing: `FONT GEN`

```
10 'INITIALIZE PROGRAM
20 POKE 65497,0
30 ON BRK GOTO 1300
40 HBUFF 1,5900
50 'INITIALIZE TEST STRINGS
60 FOR J=33 TO 64:T1$=T1$+CHR$(J
):NEXT
70 FOR J=65 TO 96:T2$=T2$+CHR$(J
):NEXT
80 FOR J=97 TO 127:T3$=T3$+CHR$(
J):NEXT
90 HSCREEN 2
100 PALETTE 1,0:PALETTE 0,54:PAL
ETTE 2,36:PALETTE 15,38
110 HCOLOR 15,0:HLINE(0,0)-(130,
88),PSET,BF:HCOLOR 1,0:HGET(0,0)
-(130,88),1
120 'MAIN PROGRAM HERE
130 FOR X=150 TO 310 STEP 20
140 HLINE(X,6)-(X,166),PSET
150 NEXT X
160 FOR Y=6 TO 166 STEP 20
170 HLINE(150,Y)-(310,Y),PSET
180 NEXT Y
190 HPRINT (2,0),"FONT CREATOR"
200 HPRINT (0,1),"By Dave Jenkin
s"
210 HPRINT (0,3),"Press characte
r"
220 HPRINT (3,4),"to define OR"
230 HPRINT (0,5),"Press SPACE BA
R"
240 HPRINT (3,6),"for commands"
250 HPRINT (0,7),"Press <F2>"
260 HPRINT (3,8),"for special"
270 HPRINT (3,9),"characters"
280 D$=INKEY$:IF D$="" THEN 280
290 IF D$=CHR$(4) THEN 1380 'F2
KEY?
300 IF D$=" " THEN 890 ELSE IF A
SC(D$)<32 THEN 280
310 GOSUB 1280 'CLEAR COMMAND BO
```

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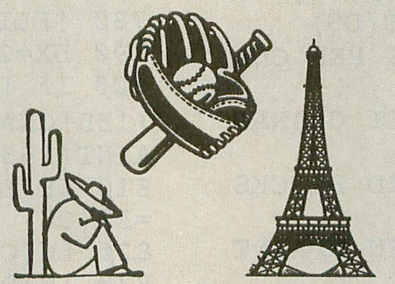

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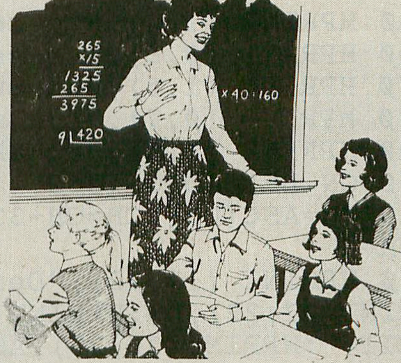

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```
X
320 HPRINT (0,1),"Press ARROWS"
330 HPRINT (1,2),"to select bloc
k"
340 HPRINT (0,3),"Press SPACE BA
R"
350 HPRINT (1,4),"to set/reset"
360 HPRINT (0,5),"Press ENTER"
370 HPRINT (1,6),"to put in RAM"
380 HPRINT (0,7),"Press BREAK"
390 HPRINT (1,8),"to abort"
400 ON BRK GOTO 1560
410 CH=ASC(D$):CH=CH-33:OF=61605
+CH*8
420 HPRINT (17,22),"Defining:":H
PRINT(27,22),D$:HPRINT(30,22),"A
SCII=":HPRINT(36,22),ASC(D$)
430 FOR Y=0 TO 7 '8 ROWS PER CHA
RACTER
440 LN(Y)=PEEK(OF+Y) 'GET CHARAC
TER
450 'DETERMINE WHICH GRID BLOCKS
 TO SET
460 IF LN(Y) AND 128 THEN HPAINT
(155,Y*20+10),2,1
470 IF LN(Y) AND 64 THEN HPAINT(
175,Y*20+10),2,1
480 IF LN(Y) AND 32 THEN HPAINT(
195,Y*20+10),2,1
490 IF LN(Y) AND 16 THEN HPAINT(
215,Y*20+10),2,1
500 IF LN(Y) AND 8 THEN HPAINT(2
35,Y*20+10),2,1
510 IF LN(Y) AND 4 THEN HPAINT(2
55,Y*20+10),2,1
520 IF LN(Y) AND 2 THEN HPAINT(2
75,Y*20+10),2,1
530 IF LN(Y) AND 1 THEN HPAINT(2
95,Y*20+10),2,1
540 NEXT Y
550 CX=0 'INITIALIZE CURSOR TO 0
,0
560 CY=0
570 HLINE(CX*20+150,CY*20+6)-(CX
*20+170,CY*20+26),PSET,B
580 E$=INKEY$
590 IF E$=CHR$(94) THEN 690 'UP
ARROW
600 IF E$=CHR$(10) THEN 710 'DOW
N ARROW
610 IF E$=CHR$(8) THEN 730 'LEFT
 ARROW
620 IF E$=CHR$(9) THEN 750 'RIGH
T ARROW
630 IF E$=" " THEN 790 'SPACE BA
R
640 IF E$=CHR$(13) THEN 840 'ENT
ER
650 HLINE(CX*20+150,CY*20+6)-(CX
*20+170,CY*20+26),PRESET,B
660 FOR DLAY=1 TO 100:NEXT DLAY
670 GOTO 570
680 'MOVE CURSOR, WRAP IF NECESS
ARY
690 CY=CY-1:IF CY<0 THEN CY=7
700 GOTO 570
710 CY=CY+1:IF CY>7 THEN CY=0
720 GOTO 570
730 CX=CX-1:IF CX<0 THEN CX=7
740 GOTO 570
750 CX=CX+1:IF CX>7 THEN CX=0
760 GOTO 570
770 'CHECK IF BLOCK IS SET OR CL
EAR AND
780 'FLIP IT
790 BX=2^(7-CX)
800 IF LN(CY) AND BX THEN HPAINT
(155+CX*20,11+CY*20),0,1 ELSE HP
AINT(155+CX*20,11+CY*20),2,1
810 IF LN(CY) AND BX THEN LN(CY)
=LN(CY) AND (255-BX):GOTO 570
820 LN(CY)=LN(CY) OR BX:GOTO 570
830 'STORE CURRENT CHARACTER IN
RAM
840 FOR Y=0 TO 7
850 POKE 61605+CH*8+Y,LN(Y)
860 NEXT Y
870 HCLS:GOSUB 1280:GOTO 130
880 'OTHER COMMANDS
890 GOSUB 1280
900 HPRINT (1,0),"OTHER COMMANDS
"
910 HPRINT (1,1),"<S>ave Font"
920 HPRINT (1,2),"<L>oad Font"
930 HPRINT (1,3),"<I>nstructions
"
940 HPRINT (1,4),"<B>ack to Main
"
950 HPRINT (1,5),"<D>isplay font
"
960 HPRINT (1,6),"<E>nd Program"
970 D$=INKEY$:IF D$="" THEN 970
980 IF D$="D" OR D$="d" THEN 131
0
990 IF D$="B" OR D$="b" THEN GOS
UB 1280:GOTO 190
1000 IF D$="E" OR D$="e" THEN PO
KE 65496,0:RGB:CLS:END
1010 IF D$="L" OR D$="l" THEN PO
KE 65496,0:WIDTH 40:PRINT"LOAD F
ONT":INPUT"FILENAME (NO EXTENSIO
N)";F$:F$=F$+".FNT":LOADM F$:POK
E 65497,0:HSCREEN2:GOSUB 1280:GO
TO 130
1020 IF D$="S" OR D$="s" THEN PO
KE 65496,0:WIDTH 40:PRINT"SAVE F
```

```
ONT":INPUT"FILENAME (NO EXTENSIO
N)";F$:F$=F$+".FNT":SAVEM F$,616
05,62364,0:POKE 65497,0:HSCREEN2
:GOSUB1280:GOTO 130
1030 IF D$="I" OR D$="i" THEN 10
40 ELSE 970
1040 WIDTH 40
1050 PRINT"FONT CREATOR"
1060 PRINT
1070 PRINT"   This program will
create and save a"
1080 PRINT"new font for the HPRI
NT command to use"
1090 PRINT"on the COCO 3 HI-RES
screens. It is"
1100 PRINT"very easy to use.  At
 the main screen"
1110 PRINT"enter the character y
ou wish to define,"
1120 PRINT"or press <SPACE> for
other commands."
1130 PRINT"To define, simply use
 the arrow keys to"
1140 PRINT"move to the desired b
lock on the grid."
1150 PRINT"Press <SPACE> to eith
er set or clear"
1160 PRINT"the block that is fla
shing. When you"
1170 PRINT"have defined the char
acter completely,"
1180 PRINT"press <ENTER> to cont
inue.  After you"
1190 PRINT"have defined the enti
re font, use the"
1200 PRINT"<S>ave command to sav
e it to disk."
1210 PRINT"Then, when you want t
o use the new font"
1220 PRINT"simply do a LOADM to
load it in. DO NOT"
1230 PRINT"EXECUTE!"
1240 PRINT
1250 PRINT "Press a key to begin
."
1260 D$=INKEY$:IF D$="" THEN 126
0 ELSE HSCREEN2:GOSUB 1280:GOTO
130
1270 'CLEAR COMMAND BLOCK
1280 HPUT(0,0)-(130,88),1,PSET
1290 RETURN
1300 POKE 65496,0:RGB:WIDTH 40:C
LS:END
1310 HCLS
1320 HPRINT (0,10),T1$
1330 HPRINT (0,12),T2$
1340 HPRINT (0,14),T3$
1350 HPRINT (0,19),"Press any ke
y when ready to continue."
1360 D$=INKEY$:IF D$="" THEN 136
0
1370 HCLS:GOSUB 1280:GOTO 130
1380 GOSUB 1280
1390 HPRINT (0,0),"Press letter"
1400 HPRINT (2,1),"for character
"
1410 HPRINT (0,4),"A  B  C  D  E
  F"
1420 HPRINT (0,5),CHR$(96)
1430 HPRINT (3,5),CHR$(123)
1440 HPRINT (6,5),CHR$(124)
1450 HPRINT (9,5),CHR$(125)
1460 HPRINT (12,5),CHR$(126)
1470 HPRINT (15,5),CHR$(127)
1480 A$=INKEY$:IF A$<"A" OR A$>"
F" THEN 1480
1490 IF A$="A" THEN D$=CHR$(96)
1500 IF A$="B" THEN D$=CHR$(123)
1510 IF A$="C" THEN D$=CHR$(124)
1520 IF A$="D" THEN D$=CHR$(125)
1530 IF A$="E" THEN D$=CHR$(126)
1540 IF A$="F" THEN D$=CHR$(127)
1550 GOTO 310
1560 ON BRK GOTO 1300
1570 HCLS
1580 GOSUB 1280
1590 GOTO 130
```

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PRINTER UTILITY

16K ECB

The DMP-105 Takes a Bow

By Drue King

After experimenting with the DMP-105 printer, I thought it was time for everyone to know just what this little printer can do.

DMP-105 Dumper, a 16K Extended BASIC program, prints a dot-for-dot picture with a choice of 3⅛ by 3 4/8 inch or 6⅜ by 7⅛ inch picture in normal or reversed print (black on white or white on black) at a specified baud rate (600 or 2400).

Lines 10 and 20 set a variable and a table. Lines 30 through 110 ask a series of questions about the type of picture you want. Line 90 asks for the graphics page start address, so your graphic picture can be on any graphics page. The graphics page start addresses are listed in the memory map in the back of your Color BASIC manual.

After setting the correct size, Line 140 goes to the appropriate print routine. So *Dumper* can be converted to another printer, all printer control codes are listed in Table 1.

Table 1

Printer Control Codes

Code	Function
CHR$(13)	Carriage return
CHR$(18)	Set graphics mode
CHR$(27); CHR$(19)	Set standard font
CHR$(27);CHR$(14)	Start elongation mode
CHR$(27);CHR$(90);CHR$(1);	1/72 inch line feed
CHR$(27);CHR$(16);CHR$(0);CHR$(143);	Position head to dot position 143
CHR$(27);CHR$(16);CHR$(0);CHR$(47);	Position head to dot position 47

The problem with printing a correct screen dump with the DMP-105 is the print head is only seven pins high while a byte is eight bits. We have to print a row of seven dots, then return and print the eighth row. This is done in lines 200 through 210 for the large dump section and lines 330 through 340 for the small.

Essentially, all the program does is, after printing a row of seven dots, check to see if the eighth bit of the present byte is turned on (if the byte's value is greater than 128) and send the right character `CHR$(192)` to print a dot and `CHR$(128)` for no dot, depending on whether you have picked a normal or reversed screen dump.

In the DMP-105's graphics mode, any number sent to the printer that is less than 128 is considered a control code. We have to add 128 to our graphics values before they are sent to the printer. This is done in lines 170 and 300.

Most of the large screen dump section is an altered version of Mr. Kromeke's *Large Screen Dump* in "Pictures Perfect with Prowriter" (RAINBOW, May 1985). If you have questions on how the graphics are expanded, that article explains it in detail.

After the printer is finished, the screen should switch back to text and say "Done" in the top-left corner of the screen. You should have a complete, centered picture.

Drue King is 21 years old and lives in Lanesville, Indiana. He is a graduate of Prosser Vocational School and has worked with the Color Computer for five years.

If you have any problems or questions, you can contact me at RR #1 Highway 62, Lanesville, IN 47136, phone (812) 952-2467. Please enclose an SASE for a reply. ☐

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The listing: `DUMP105`

```
2 '      DMP-105 DUMPER
3 '        BY DRUE KING
4 '
10 DIMD(15):CL=1
20 FOR X=0 TO 15:READ A:D(X)=A:N
EXT X
30 CLS:PRINT@9,"PMODE4 DUMP"
40 :PRINT:PRINT" 1) (3 1/8) X (3
 4/8)":PRINT" 2) (6 3/8) X (7 1/
8)":PRINT:INPUT"SIZE";SZ
50 IF SZ<>1 AND SZ<>2 THEN 40
60 PRINT:PRINT" 1) NORMAL ":PRIN
T" 2) reverse":PRINT:INPUT" OUTP
UT";OP
70 IF OP<>1 AND OP<>2 THEN 60
80 PRINT@240,"1) 600";:PRINT@272
,"2) 2400";:PRINT@336,"BAUD RATE
";:INPUT PT:IF PT<>1 AND PT<>2 T
HEN 80 ELSE IFPT=1THEN POKE150,8
8 ELSE POKE150,18
90 PRINT:INPUT"GRAPHICS PAGE STA
RT ADD.";AD
100 AD=AD+31:KE=AD-1
110 PRINT:PRINT"  ALIGN PAPER TO
 TOP OF RIBBON":PRINT"          A
ND HIT ENTER";
120 A$=INKEY$:IFA$=""THEN120
130 PRINT#-2,CHR$(18);:SCREEN1,1
140 IF SZ=1 THEN PRINT#-2,CHR$(2
7);CHR$(19):GOTO270  ELSE PRINT#
-2,CHR$(27);CHR$(14):GOTO150
150 FOR SP=1 TO 20:PRINT#-2,CHR$
(13);:NEXT
160 GOSUB350:FOR AD=KE+1 TO KE+6
113 STEP32:P=PEEK(AD):J=D((P AND
 15)):IF OP=1 THEN J=255-J
170 IF J<128 THEN J=J+128
180 PRINT#-2,CHR$(J);:NEXT
190 GOSUB350
200 PRINT#-2,CHR$(27);CHR$(90);C
HR$(1);:FOR GN=KE+1 TO KE+6113 S
TEP32:P=PEEK(GN):P=D((P AND 15))
:IF P>63 AND OP=1 THEN PRINT#-2,
CHR$(128);:NEXT:GOTO220ELSEIF OP
=1 THENPRINT#-2,CHR$(192);:NEXT:
GOTO220
210 IF P>63 THENPRINT#-2,CHR$(19
2);:NEXT ELSE PRINT#-2,CHR$(128)
;:NEXT
220 PRINT#-2,CHR$(13);:GOSUB350:
FOR BA=KE+1 TO KE+6113 STEP 32:P
=(PEEK(BA) AND 240)/16:J=D(P):IF
 OP=1 THEN J=255-J
230 IF J<128 THEN J=J+128
240 PRINT#-2,CHR$(J);:NEXT
250 GOSUB350:GOSUB330:PRINT#-2,C
HR$(13);
260 KE=KE-1:CL=CL+1:IF CL=33 THE
N SCREEN0,1:CLS:PRINT@0,"DONE":S
TOP ELSE GOTO160
270 FORSP=1TO37:PRINT#-2,CHR$(13
);:NEXT
280 PRINT#-2,CHR$(27);CHR$(16);C
HR$(0);CHR$(143);
290 FOR AD=KE+1 TO KE+6113 STEP3
2:J=PEEK(AD):IF OP=1 THEN J=255-
J
300 IF J<128 THEN J=J+128
310 PRINT#-2,CHR$(J);:NEXT
320 PRINT#-2,CHR$(27);CHR$(16);C
HR$(0);CHR$(143);:GOSUB 330:PRIN
T#-2,CHR$(13);:KE=KE-1:CL=CL+1:I
F CL=33 THEN SCREEN0,1:CLS:PRINT
@0,"DONE":STOP ELSE GOTO 280
330 PRINT#-2,CHR$(27);CHR$(90);C
HR$(1);:FOR GN=KE+1 TO KE+6113 S
TEP32:P=PEEK(GN):IF P>=128 AND O
P=1 THEN PRINT#-2,CHR$(128);:NEX
T:RETURN  ELSE IF OP=1 THEN PRIN
T#-2,CHR$(192);:NEXT:RETURN
340 IF P>=128 THEN PRINT#-2,CHR$
(192);:NEXT:RETURN ELSE PRINT#-2
,CHR$(128);:NEXT:RETURN
350 PRINT#-2,CHR$(27);CHR$(16);C
HR$(0);CHR$(47);:RETURN
360 DATA 0,3,12,15,48,51,60,63,1
92,195,204,207,240,243,252,255
```

Two-Liner Contest Winner . . .

If you change the `PRINT`s to `PRINT#-2`, you can use this routine to print scrambled words. Just enter the word you want to scramble.

The listing:

```
10 IF Q=0 THEN CLS:INPUT "ENTER
JUMBLE";A$:L=LEN(A$):FOR X=1 TO
L:B$(X)=MID$(A$,X,1):NEXT X:FOR
Z=1 TO L ELSE FOR Z=1 TO L
20 Q=1:R=RND(L):IF T(R)=1 THEN 2
0 ELSE T(R)=1:PRINT B$(R);:NEXT
Z:FOR Y=1 TO L:T(Y)=0:NEXT Y:PRI
NT " ";:GOTO 10
```

Matt Hazard
Columbia Station, OH

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

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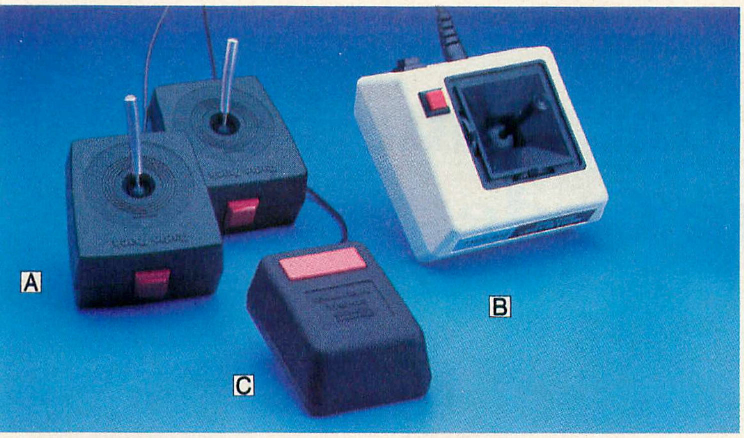

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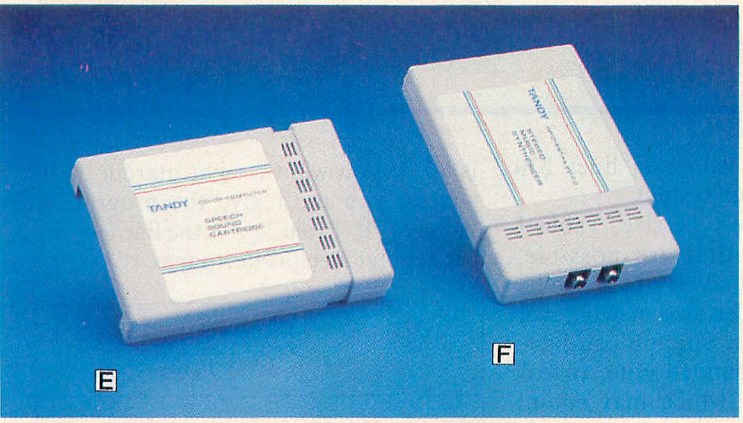
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PRINTER UTILITY

16K

A program to set up your SG-10

The Printer That Came in From the Code

By David R. Jenkins

One of the problems with owning a printer as versatile as the Star SG-10 is keeping track of all the different codes for different type sizes, fonts, spacing, etc. In short order, your owner's manual wears out!

This program will set up the printer for you. The program is completely menu-driven, so it is nearly self-explanatory. It also shows how you can set up a multiple-level, menu-driven program easily.

The main menu allows you to select different groups of functions. When you select a group of functions, you receive another menu of specific functions. You may then see yet another small menu of options.

Important: Set the baud rate first. This program sends codes to your printer, and the baud rate must be correct or the entire program will either work incorrectly, or freeze. If you have a switcher on your printer port, be sure it is in the printer position.

Here is a rundown of the program options. Option 1 sets the baud rate of the computer. The program accepts the baud rate as an actual number (e.g., 600) rather than a meaningless code (such as 88). Enter a speed of 600, 1200, 2400, 4800, or 9600 (no commas). Other entries are rejected. You may have to slightly adjust the values in lines 230 through 270 for your system.

Option 2 sets the type size. Table 1 shows the widths that are possible. Notice that "expanded" is not a size by itself, but doubles the size of whatever the printer is set for. So, you can have expanded pica, expanded elite, or expanded condensed (which may sound ridiculous but actually looks pretty good). "Never Mind" returns you to the main menu.

Table 1: Characters per inch for type sizes

	Normal	Expanded
Pica	10 cpi	5 cpi
Elite	12 cpi	6 cpi
Condensed	17 cpi	8.5 cpi

(cpi = characters per inch)

Option 3 selects the type font, or style. Many of the fonts are on/off, and you are asked if you are turning the font on or off. Underlining is also included in this set of options.

Option 4 allows you to set the top, bottom, left and right margins on the printer. For the top, bottom and left margins, simply enter the value of lines or spaces you want.

The printer handles the right margin differently. You have to take the current line length and subtract the amount of margin, to get the proper value. For instance, with pica type, the line length is 80. If you want a right margin of 10 spaces, you must give the program a value of 70. Table 2 gives the line lengths for regular size printer paper.

Table 2: Line lengths for 8.5 inch wide paper

Characters per line	
Pica	80
Elite	96
Condensed	136

Miscellaneous functions is a catchall for options that do not seem to fit anywhere else. As it turned out, the only function I wanted was the slashed zero option.

Option 6 sets the line spacing. You can set the spacing to practically any value in increments down to $^{1}/_{216}$th of an inch. The normal setting is $^{1}/_{6}$ inch.

Option 7 reinitializes the printer. Then the printer is set up exactly as when you power up. Note the "top of form" is set where the paper is located. If it isn't at the top, the top of form will be set incorrectly. Do a form feed from the printer control keys before a reinitialization.

I did not include many of the options available because they are too specialized (graphics setups, for example). However, if you use these functions frequently, you can add them to the program.

Dave Jenkins is an engineer at WNIN FM/TV in Evansville, Indiana, and has been using his Color computers for six years.

This program demonstrates how simply you can make even a complicated program easy to use. You can layer menus on top of menus to cover every option. The CoCo 3 gives you an easy way to get to the main menu with the BREAK key trap. You set the BREAK key trap (ON BRK GOTO . . .) to the first line on your main menu. Then, anytime you want to get to the top menu, all you do is press the BREAK key.

(Questions about this program may be addressed to the author at 1418 E. Illinois St., Evansville, IN 47711. Please enclose an SASE for a reply.) ☐

200	66
400	220
620	45
770	217
960	249
1150	77
1310	141
1480	54
END	96

The listing: SG10SET

```
10 CLS
20 PRINTTAB(8);"SG-10 PRINTER SE
T-UP"
30 PRINT
40 PRINTTAB(5);"1. SET COMPUTER
BAUD RATE"
50 PRINTTAB(5);"2. SET TYPE SIZE
"
60 PRINTTAB(5);"3. SET TYPE FONT
"
70 PRINTTAB(5);"4. SET MARGINS"
80 PRINTTAB(5);"5. SET MISC FUNC
TIONS"
90 PRINTTAB(5);"6. SET LINE SPAC
ING"
100 PRINTTAB(5);"7. RE-INITIALIZ
E PRINTER"
110 PRINTTAB(5);"8. END PROGRAM"
120 PRINT
130 PRINTTAB(5);"SELECTION-->";
140 I$=INKEY$:IF I$="" THEN 140
150 IF VAL(I$)<1 OR VAL(I$)>8 TH
EN 140
160 PRINT I$
170 ON VAL(I$) GOSUB 200,290,480
,960,1260,1370,1660,1670
180 PRINT#-2,CHR$(7);
190 GOTO 10
200 CLS
210 INPUT"BAUD RATE";BR
220 IF BR<>600 AND BR<>1200 AND
BR<>2400 AND BR<>4800 AND BR<>96
00 THEN PRINT"INVALID BAUD RATE.
 TRY AGAIN.":PRINT:GOTO210
230 IF BR=600 THEN POKE 150,88:R
ETURN
240 IF BR=1200 THEN POKE 150,41:
RETURN
250 IF BR=2400 THEN POKE 150,18:
RETURN
260 IF BR=4800 THEN POKE 150,6:R
ETURN
270 POKE 150,1
280 RETURN
290 CLS:PRINTTAB(9)"SET TYPE SIZ
E"
300 PRINT
310 PRINTTAB(5);"1. PICA"
320 PRINTTAB(5);"2. ELITE"
330 PRINTTAB(5);"3. CONDENSED"
340 PRINTTAB(5);"4. EXPANDED ON"
350 PRINTTAB(5);"5. EXPANDED OFF
"
360 PRINTTAB(5);"6. NEVER MIND"
370 PRINT
380 PRINTTAB(5);"SELECTION-->";
390 I$=INKEY$:IFI$=""THEN390
400 IF VAL(I$)<1 OR VAL(I$)>6 TH
EN 390 ELSE PRINT I$
410 IF VAL(I$)=6 THEN RETURN
420 ON VAL(I$) GOTO 430,440,450,
460,470
430 PRINT#-2,CHR$(27);CHR$(66);C
HR$(1);:RETURN
440 PRINT#-2,CHR$(27);CHR$(66);C
HR$(2);:RETURN
450 PRINT#-2,CHR$(27);CHR$(66);C
HR$(3);:RETURN
460 PRINT#-2,CHR$(27);CHR$(87);C
HR$(1);:RETURN
470 PRINT#-2,CHR$(27);CHR$(87);C
HR$(0);:RETURN
480 CLS:PRINTTAB(9);"SET TYPE FO
NT"
490 PRINT
500 PRINTTAB(5);"1. NORMAL"
510 PRINTTAB(5);"2. ITALIC"
520 PRINTTAB(5);"3. NEAR LETTER
QUALITY"
530 PRINTTAB(5);"4. PROPORTIONAL
"
540 PRINTTAB(5);"5. DOUBLE-STRIK
E"
550 PRINTTAB(5);"6. EMPHASIZED"
560 PRINTTAB(5);"7. UNDERLINING"
570 PRINTTAB(5);"8. NEVER MIND"
580 PRINT
590 PRINTTAB(5);"SELECTION-->";
600 I$=INKEY$:IF I$=""THEN 600
610 IF VAL(I$)<1 OR VAL(I$)>8 TH
EN 600 ELSE PRINT I$
620 IF VAL(I$)=8 THEN RETURN
630 ON VAL(I$) GOTO 640,650,660,
720,780,840,900
640 PRINT#-2,CHR$(27);CHR$(53);:
RETURN
650 PRINT#-2,CHR$(27);CHR$(52);:
```

```
RETURN
660 CLS:PRINT"NEAR LETTER QUALIT
Y..."
670 PRINT"   ...ON  (1)"
680 PRINT"   ...OFF (2)"
690 I$=INKEY$:IFI$=""THEN690 ELS
E IF VAL(I$)<1 OR VAL(I$)>2 THEN
 690 ELSE PRINT I$
700 IF VAL(I$)=1 THEN PRINT#-2,C
HR$(27);CHR$(66);CHR$(4);:RETURN
710 PRINT#-2,CHR$(27);CHR$(66);C
HR$(5);:RETURN
720 CLS:PRINT"PROPORTIONAL..."
730 PRINT"   ...ON  (1)"
740 PRINT"   ...OFF (2)"
750 I$=INKEY$:IFI$=""THEN750 ELS
E IF VAL(I$)<1 OR VAL(I$)>2 THEN
 750 ELSE PRINT I$
760 IF VAL(I$)=1 THEN PRINT#-2,C
HR$(27);CHR$(112);CHR$(1);:RETUR
N
770 PRINT#-2,CHR$(27);CHR$(112);
CHR$(0);:RETURN
780 CLS:PRINT"DOUBLE-STRIKE..."
790 PRINT"   ...ON  (1)"
800 PRINT"   ...OFF (2)"
810 I$=INKEY$:IFI$="" THEN 810 E
LSE IF VAL(I$)<1 OR VAL(I$)>2 TH
EN 810 ELSE PRINT I$
820 IF VAL(I$)=1 THEN PRINT#-2,C
HR$(27);CHR$(71);:RETURN
830 PRINT#-2,CHR$(27);CHR$(70);:
RETURN
840 CLS:PRINT"EMPHASIZED..."
850 PRINT"   ...ON  (1)"
860 PRINT"   ...OFF (2)"
870 I$=INKEY$:IFI$="" THEN 870 E
LSE IF VAL(I$)<1 OR VAL(I$)>2 TH
EN 870 ELSE PRINT I$
880 IF VAL(I$)=1 THEN PRINT#-2,C
HR$(27);CHR$(69);:RETURN
890 PRINT#-2,CHR$(27);CHR$(70);:
RETURN
900 CLS:PRINT"UNDERLINING..."
910 PRINT"   ...ON  (1)"
920 PRINT"   ...OFF (2)"
930 I$=INKEY$:IFI$=""THEN 930 EL
SE IF VAL(I$)<1 OR VAL(I$)>2 THE
N 930 ELSE PRINT I$
940 IF VAL(I$)=1 THEN PRINT#-2,C
HR$(27);CHR$(45);CHR$(1);:RETURN
950 PRINT#-2,CHR$(27);CHR$(45);C
HR$(0);:RETURN
960 CLS:PRINTTAB(12);"MARGINS"
970 PRINT
980 PRINTTAB(5);"1. TOP"
990 PRINTTAB(5);"2. BOTTOM"
1000 PRINTTAB(5);"3. CANCEL TOP
& BOTTOM"
```

```
1010 PRINTTAB(5);"4. LEFT"
1020 PRINTTAB(5);"5. RIGHT"
1030 PRINTTAB(5);"6. NEVER MIND"
1040 PRINT
1050 PRINTTAB(5);"SELECTION-->";
1060 I$=INKEY$:IFI$=""THEN1060 E
LSE IF VAL(I$)<1 OR VAL(I$)>6 TH
EN 1060 ELSE PRINT I$
1070 IF VAL(I$)=6 THEN RETURN
1080 ON VAL(I$) GOTO 1090,1130,1
170,1180,1220
1090 CLS
1100 INPUT"LINES FOR TOP MARGIN"
;TM
1110 IF TM<0 OR TM>255 THEN PRIN
T"INVALID MARGIN SELECTION.":PRI
NT:GOTO1100
1120 PRINT#-2,CHR$(27);CHR$(82);
CHR$(TM);:RETURN
1130 CLS
1140 INPUT"LINES FOR BOTTOM MARG
IN";BM
1150 IF BM<0 OR BM>255 THEN PRIN
T"INVALID MARGIN SELECTION.":PRI
NT:GOTO1140
1160 PRINT#-2,CHR$(27);CHR$(78);
CHR$(BM);:RETURN
1170 PRINT#-2,CHR$(27);CHR$(79);
:RETURN
1180 CLS
1190 INPUT"SPACES FOR LEFT MARGI
N";LM
1200 IF LM<0 OR LM>50 THEN PRINT
"INVALID MARGIN SELECTION.":PRIN
T:GOTO1190
1210 PRINT#-2,CHR$(27);CHR$(77);
CHR$(LM);:RETURN
1220 CLS
1230 INPUT"SPACES FOR RIGHT MARG
IN";RM
1240 IF RM<0 OR RM>132 THEN PRIN
T"INVALID MARGIN SELECTION.":PRI
NT:GOTO1230
1250 PRINT#-2,CHR$(27);CHR$(81);
CHR$(RM);:RETURN
1260 CLS:PRINTTAB(4);"MISCELLANE
OUS FUNCTIONS"
1270 PRINT
1280 PRINTTAB(5);"1. ZERO WITH S
LASH"
1290 PRINTTAB(5);"2. ZERO WITHOU
T SLASH"
1300 PRINTTAB(5);"3. NEVER MIND"
1310 PRINT
1320 PRINTTAB(5);"SELECTION-->";
1330 I$=INKEY$:IF I$="" THEN 133
0 ELSE IF VAL(I$)<1 OR VAL(I$)>3
 THEN 1330 ELSE PRINT I$
1340 IF VAL(I$)=3 THEN RETURN
```

```
1350 IF VAL(I$)=1 THEN PRINT#-2,
CHR$(27);CHR$(92);CHR$(1);:RETUR
N
1360 PRINT#-2,CHR$(27);CHR$(92);
CHR$(0);:RETURN
1370 CLS:PRINTTAB(10);"LINE SPAC
ING"
1380 PRINT
1390 PRINTTAB(5);"1. SET TO 1/8
 INCH"
1400 PRINTTAB(5);"2. SET TO 7/72
 INCH"
1410 PRINTTAB(5);"3. SET TO 1/6
 INCH"
1420 PRINTTAB(5);"4. SET TO n/72
 INCH"
1430 PRINTTAB(5);"5. SET TO n/14
4 INCH"
1440 PRINTTAB(5);"6. SET TO n/21
6 INCH"
1450 PRINTTAB(5);"7. NEVER MIND"
1460 PRINT
1470 PRINTTAB(5);"SELECTION-->";
1480 I$=INKEY$:IFI$=""THEN1480 E
LSE IF VAL(I$)<1 OR VAL(I$)>8 TH
EN 1480 ELSE PRINT I$
1490 IF VAL(I$)=7 THEN RETURN
1500 ON VAL(I$) GOTO 1510,1520,1
530,1540,1580,1620
1510 PRINT#-2,CHR$(27);CHR$(48);
:RETURN
1520 PRINT#-2,CHR$(27);CHR$(49);
:RETURN
1530 PRINT#-2,CHR$(27);CHR$(50);
:RETURN
1540 CLS
1550 INPUT"HOW MANY 72ths OF AN
INCH";SP
1560 IF SP<0 OR SP>255 THEN PRIN
T"INPUT ERROR":PRINT:GOTO1550
1570 PRINT#-2,CHR$(27);CHR$(65);
CHR$(SP);:RETURN
1580 CLS
1590 INPUT"HOW MANY 144ths OF AN
 INCH";SP
1600 IF SP<0 OR SP>255 THEN PRIN
T"INPUT ERROR":PRINT:GOTO 1590
1610 PRINT#-2,CHR$(27);CHR$(51);
CHR$(SP);:RETURN
1620 CLS
1630 INPUT"HOW MANY 216ths OF AN
 INCH";SP
1640 IF SP<0 OR SP>255 THEN PRIN
T"INPUT ERROR":PRINT:GOTO1630
1650 PRINT#-2,CHR$(27);CHR$(51);
CHR$(SP);:RETURN
1660 PRINT#-2,CHR$(27);CHR$(64);
:RETURN
1670 CLS:END
```

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EDUCATION NOTES

16K ECB

Learning About Scales Key To Understanding Maps

By Steve Blyn
Rainbow Contributing Editor

Map skills are taught throughout the elementary and middle school years. They often are begun by using familiar regions such as the child's classroom or living room. The child sees that these rooms are areas obviously too large to replicate on paper. Maps become the way the child can draw these rooms on paper — later on he can draw other places and distances. Once the child grasps the concept of the need for maps, other skills, such as measurement, estimation and scaling, can be taught when deemed appropriate.

This month's program presents an introduction to reading scale drawings on a map. Children often learn to render scale drawings to represent distances from their home to school, to the library or to any other point of interest. If these distances are not known, the teacher often suggests appropriate distances. The pupils usually indicate their scales on the bottom of these drawings.

Next, the pupils learn to construct an ascending table of values based on the various scales. For example, if one inch represents two miles, the table might look like this:

SCALE 1 INCH = 2 MILES

Inches:	1 in.	2 in.	3 in.	4 in.	5 in.
Miles:	2 mi.	4 mi.	6 mi.	8 mi.	10 mi.

Our program can be approached in a similar manner, using two colored lines. The shorter, blue line represents the scale. A chart such as the one shown here can be drawn for each different scale. It is drawn in Line 80.

The longer, red line represents the line whose length is to be determined by the user. This could be the distance to school or to grandmother's house or any other example you or the children can think of. This line is randomly chosen in Line 70 and drawn in Line 140.

Three values are presented to the student. One of the values is the approximate correct answer. The other two are too far out of line to be possibilities. The values are chosen and printed on lines 180 to 240 in random order. We had to be careful to scramble the order of the three possible answers. For example, we wouldn't want the correct answer to always appear in the middle, or always be the largest or smallest value. The correct answer is always retained by the computer, as variable Y.

Lines 260 to 270 accept the student's answer and convert it to a numeric value. Lines 280 to 290 inform the student whether he was correct or incorrect, and what the real answer should be. The counter is on Line 60. After 10 tries, the score is displayed and the user chooses to end the program or play again.

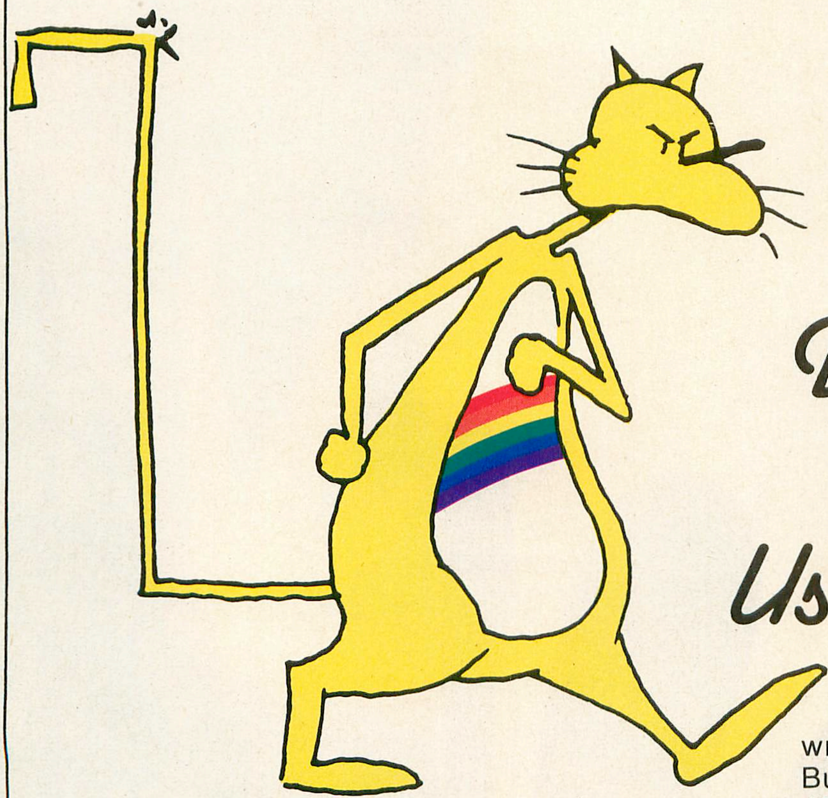
There are two methods the child may use to determine the correct answer — actual measurement on the screen with a ruler or estimation. Both are acceptable means of arriving at the correct answer, and both should be encouraged. The best of both worlds would be, first estimate and then measure, to check out the answers. We, at Computer Island, hope that your child/students enjoy and learn from this program. ☐

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: `MAPSCALE`

```
10 REM"SCALE DRAWINGS"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1987
30 CLS0:PRINT@3,"SCALE DRAWINGS"
;
40 N=N+1:PRINT@26,"#=";N;
50 PRINT@90,"C=";CR;
60 IF N=11 THEN PRINT@26,"TOTALS
";:PRINT@154,CR*10;"%";:PRINT@48
```

```
2,"PRESS G TO GO ON OR E TO END"
;:GOTO 330
70 B=7+RND(55)
80 FOR T=0 TO 7:SET(T,7,7):NEXT
T
90 X1=RND(5):X2=RND(5)
100 X=X1*X2*10
110 R=RND(3):IF R=1 THEN R$="FEE
T" ELSE IF R=2 THEN R$="MILES" E
LSE R$="IN."
120 PRINT@104,"=";
130 PRINT@108,X;R$;
140 FOR T=0 TO B:SET(T,13,8):NEX
T T
150 PRINT@256,"THE RED LINE IS A
BOUT HOW LONG?"
160 AN=B/8:AN=INT(AN+.5)
170 REM"THE VARIABLE Y IS THE CO
RRECT ANSWER"
180 Y=X*AN
190 U=RND(2):IF U=1 THEN Y1=Y*2
ELSE Y1=Y/4
200 V=RND(2):IF V=1 THEN Y2=Y/2
ELSE Y2=Y*4
210 R=RND(3):PRINT@320," "
220 IF R=1 THEN PRINT@320,Y;:PRI
NT@330,Y1;:PRINT@340,Y2;
230 IF R=2 THEN PRINT@320,Y1;:PR
INT@330,Y2;:PRINT@340,Y;
240 IF R=3 THEN PRINT@320,Y2;:PR
INT@330,Y;:PRINT@340,Y1;
250 PRINT@326,"OR";:PRINT@336,"O
R";:PRINT@346,R$;
260 PRINT@384,"";:LINE INPUT EN$
270 PRINT@394,"";:EN=VAL(EN$)
280 IF EN=Y THEN PRINT"CORRECT":
CR=CR+1:PLAY"L50CDECDEGGEDC"
290 IF EN<>Y THEN PRINT"THE ANSW
ER IS"Y:PLAY"L50CCC"
300 PRINT@453,"PRESS ENTER TO GO
 ON";
310 Q$=INKEY$
320 IF Q$=CHR$(13) THEN 30 ELSE
310
330 PLAY"GGGEEECCCEGEC"
340 Q$=INKEY$
350 IF Q$="G" THEN RUN ELSE IF Q
$="E" THEN 360 ELSE 340
360 CLS:END
```



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32K
ECB

PARAMISSION: fast and dangerous!

By Michel Galibois

You are the only human who can save the world, but you are forced to jump from a cargo plane. While falling at great speed, you see a missile coming straight at you; the ground seems bigger and bigger. Just in time, you open the parachute and float slowly. You look down and see the big missile hitting a mountain.

When you *think* everything has calmed down, and you are about to land on a big tree, you see another missile coming at you. It takes quick action to avoid both. But you are able to land safely on a platform. Now you can easily save the world!

Paramission is a BASIC program but is written a special way, so it runs very fast. It requires 32K, Extended BASIC and a joystick.

This game is original, different from shoot-'em-ups. The objective of this game is to land a parachutist on one of five platforms. You can land on the easiest one, but you receive fewer points.

You have to jump from a big cargo plane; this is accomplished by pressing the firebutton. Press the button again and the parachute will open. Get yourself positioned to land on a platform by using the joystick. Move the joystick up to descend slowly, and down to land faster.

You must successfully land on all five platforms to change screens, but beware of the missile that is always trying to kill you. Take care not to land on the deadly tree or in the shark-infested waters, and avoid crashing into the building or on the steep hills.

The second screen is completely different; it's even more difficult. The missile reacts faster and is harder to avoid. Watch out, if the missile blows up near you, the explosion could kill you.

In *Paramission* you have three lives. Play levels range from easy to hard, and the graphics are high resolution.

If your computer can't take the speed-up poke (`POKE 65495,0`) you need to delete it in lines 20, 1130 and 1340. ☐

Michel Galibois is 17 years old and lives in Laval, Quebec. He is studying in Canada and has owned a Color Computer for almost four years.

120	162	870	172
220	157	1040	68
290	219	1190	246
370	58	1340	58
480	232	1410	136
560	17	1580	85
730	42	END	134

The listing: PARAMISS

```
10 CLS:PRINT@235,"GET READY"
20 POKE65495,0:PMODE4,1:PCLS:E1=
130:B1=13:BB=3:I=3:FF=130:GG=13
30 DIM AA(15),BB(24),CC(39),DD(1
0),EE(2),FF(2),GG(13),HH(10),II(
25),JJ(25),KK(10),LL(25),B$(25),
MM(56),NN(56),OO(77),PP(77),QQ(7
7)
40 CIRCLE(10,10),5:PAINT(10,10),
1:COLOR0:FORA=1TO20STEP 2:LINE(A
,0)-(A,20),PSET:NEXT:COLOR1:GET(
5,5)-(15,15),HH,G
50 FORA=1TO50:B=RND(25):C=RND(25
):PSET(50+B,50+C,1):NEXT:GET(50,
50)-(75,75),II,G:PCLS
60 DRAW"BM100,100M98,103M100,100
M105,103M101,100U3F3H3G3E3E1U1L2
D1F1D3"
70 DRAW"BM200,100A2M198,97M200,1
00M205,97M201,100U3F3H3G3E4U1L2D
1F1D3A0"
80 GET(198,105)-(205,92),GG,G
90 GET(94,103)-(109,90),AA,G
100 DRAW"BM150,10U6R4D2BD2L2R2D2
L4BR6U6R4D3L4R4D3BR2U6F2E2D6BR2U
6R4L4D3R3L3D3R4BR6U6R4D6L4BR8H2U
4D4F2E2U4BD6BR2R4L4U3R3L3U3R4BD6
BR2U6R4D3L4R1F3":GET(148,10)-(20
4,2),MM,G
110 GET(174,10)-(202,2),NN,G:PUT
(178,10)-(206,2),NN,PSET:GET(150
,10)-(206,2),NN,G
120 DRAW"BM92,91E5R8F5G6E3H3L6G3
F3H6E4C0":PAINT(96,90),1
130 FOR A=92 TO 110 STEP 2:LINE(
A,93)-(A,80),PSET:NEXT
140 COLOR 1:GET(50,50)-(54,60),D
D,G:GET(93,103)-(109,83),BB,G
150 DRAW"BM100,150S6L1R16E5R1U1L
1U3L4D1G3L11M96,147D1F1R1":PAINT
(105,148),1
```

```
160 COLOR0:LINE(103,144)-(103,14
5),PSET:LINE(105,144)-(105,145),
PSET
170 DRAW"BM110,145C0S4R6L4D3L2H1
U1BD4U1R4U1L2BR8F1E1U2H1G1D2R1U3
180 FOR A=124 TO 130 STEP 2:PSET
(A,143,0):NEXT
190 COLOR1:GET(96,151)-(135,137)
,CC,G
200 GET(149,99)-(151,101),FF,G
210 DRAW"BM170,100E3G3L1H3F3U1BU
2U1R2D1L2R2BD2D2F3H3L1G3E3U1":GE
T(166,95)-(174,105),KK,G
220 DRAW"BM10,10C5U6R4D3L4BR8BD2
U6R4D3L4R4D3U1BR4U6R4D3L4R1F3BR4
BD1U6R4D3L4R4D3BR4BD1U6F2E2D6BR4
BU1U6D6BR4BU1R4U3L4U3R4BD7BR4R4U
3L4U3R4BD7BR4U6D6BR4BU1U6R4D6L4B
R8BU1U6D1F4D1U6":GET(10,12)-(98,
2),OO,G:PUT(11,12)-(99,2),OO,OR:
GET(10,12)-(99,2),OO,G
230 DRAW"BM10,30U6R4D3L4R4BD4BR4
U6R4D3L4R4D3U1BR4U6R4D3L4R1F3BU1
BR4U6R4D3L4R4D3BR4BD1U6F2E2D6BR4
BD1U6D6BR4BU1R4U3L4U3R4BD5BR4R4U
3L4U3R4BD7BR4U6D6BR4BD1U6R4D6L4B
R8BU1U6D1F4D1U6":GET(10,32)-(98,
22),PP,G:PUT(11,32)-(99,22),PP,O
R:GET(10,32)-(99,22),PP,G
240 DRAW"BM10,50U6R4D3L4BR8BD4U6
R4D3L4R4D3BR4BD1U6R4D3L4R1F3BR4B
U1U6R4D3L4R4D3BR4BU1U6F2E2D6BD1B
R4U6D6BR4BD1R4U3L4U3R4BD5BR4R4U3
L4U3R4BD5BR4U6D6BR4BD1U6R4D6L4BR
8BD1U6D1F4D1U6":GET(10,52)-(98,4
2),QQ,G:PUT(11,52)-(99,42),QQ,OR
:GET(10,52)-(99,42),QQ,G
250 '
260 ' SCREENS
270 COLOR1:IF R=0 THEN 370 ELSEP
CLS:A=215:WW=0:E1=130:B1=13:BB=3
:D1=3:D=0:BB=0:EE=0:LINE(6,0)-(2
52,187),PSET,B:PAINT(2,2),1:COLO
R0:LINE(7,0)-(251,0),PSET:COLOR1
280 FORXX=47TO67 STEP2:LINE(XX,1
50)-(XX,168),PSET:NEXT:FORXX=95T
O108STEP2:LINE(XX,126)-(XX,147),
PSET:LINE(XX,158)-(XX,167),PSET:
NEXT:FORXX=241TO247STEP2:LINE(XX
,110)-(XX,145),PSET:NEXT
290 DRAW"BM55,160E2U2E4R2E2F2D1G
4D1G3L1G5L2G2L3H2U2E3R2E4R3BR45B
U10E3U7H2U5H2L2H2G2D3F2D7F2D3F2B
D15D4F2R1E3U4H3L1G3BM240,145U2E1
U15E2U5E1U7E1F2D5G1D17G1D5G3H3
300 DRAW"BM4,155F3R2F3D2F2R15E2U
2E2R4F2E4U5E2R2U2E3R18E5U2H2U2H2
U2H1U3E3U2E2U3E5F2R1E2F5R5F2R5F6
R2F2R2F3D5G2D3F2D3F2D2F2D13G3L2G
1D10F2R20E3R5E2F3R15E5U5E5R5E2E2
R25U20E5R5E5L15D30F3D5F7R10E8U25
E2U15E4U10E5U20E2R2E2
310 PAINT(10,180),1
320 FORXX=116TO156STEP2:LINE(183
,XX)-(207,XX),PSET:NEXT:FORXX=18
3TO207STEP6:LINE(XX,116)-(XX,156
),PSET:NEXT
330 PAINT(210,130),1
340 LINE(92,117)-(115,105),PSET:
LINE(96,119)-(119,105),PSET:CIRC
LE(121,98),17,,.50:PAINT(111,108
),1:PAINT(121,98),1:COLOR0:FORXX
=103TO138 STEP 2:LINE(XX,90)-(XX
,106),PSET:NEXT
350 COLOR1:FORXX=210TO234STEP2:L
INE(XX,162)-(XX,172),PSET:NEXT
360 GOTO 490
370 PCLS:A=215:WW=0:E1=130:B1=13
:BB=3:D1=3:D=0:BB=0:EE=0
380 DRAW"BM58,175C1R40G9L26H2U3H
1U2H1":PAINT(61,177),1
390 DRAW"BM131,175R59G10L40H10":
PAINT(134,176),1
400 FOR XX=53 TO 200 STEP 2:COLO
R 0:LINE(XX,170)-(XX,188),PSET:N
EXT:COLOR 1
```

***

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```
410 LINE(5,0)-(252,187),PSET,B:P
AINT(2,2),1:COLOR0:LINE(7,0)-(25
1,0),PSET:COLOR1:LINE(6,0)-(6,10
0),PSET
420 DRAW"BM4,68R2F4D3F3D3G4R15G4
D3G4D4G4D2G3F5D2R15D1G5D6F4D3F2D
3F2D4G3L4G2D6R2F3E2F5R3F6D4R15D4
F2D4F2R25E7R15E3R20D2F8R40E10F2R
4E1R2E1R3E1U3E3R45U40L12U15L12D5
5"
430 DRAW"BM8,140R3F3D4F2D4F3D2G3
L4H3U5H3U5E6BU10BR12H4L3H3L4G3D2
F3R5E4U3BD55BR10R8F2R5F3D1G3L7H2
L5H4E3
440 PAINT(250,150),1:PAINT(7,100
),1
450 FOR XX=5 TO 22 STEP 2:LINE(X
X,117)-(XX,190),PSET:NEXT
460 FOR XX=25 TO 49 STEP 2:LINE(
XX,177)-(XX,190),PSET:NEXT
470 FOR XX=117 TO 168 STEP 2:COL
OR 0:LINE(230,XX)-(251,XX),PSET:
NEXT:COLOR 1:LINE(247,130)-(247,
168),PSET:LINE(241,115)-(241,168
),PSET:LINE(235,115)-(235,168),P
SET
480 DRAW"BM122,175M127,150R7M132
,175":PAINT(126,170),1:CIRCLE(13
0,140),22,,.65:PAINT(130,140),1:
COLOR 0::FOR WW=101 TO 160 STEP
2:LINE(WW,110)-(WW,154),PSET:NEX
T:WW=0
490 '
500 WW=WW+1:COLOR1:IF R=0THEN ON
 WW GOSUB 980,990,1000,1010,1020
 ELSE ON WW GOSUB 1030,1040,1050
,1060,1070
510 FOR CD=CE TO CE+15 STEP 2:LI
NE(CD,CF)-(CD,CF+3),PSET:NEXT CD
520 IF WW<>5THEN500 ELSE GOSUB14
90
530 '
540 ' PRESENTATION
```

```
550 SCREEN1,1:IF M=1THEN620ELSEF
ORXX=1TO14:PLAY"V-L255O1D":PUT(9
0,50)-(179,60),OO,PSET:PLAY"D":P
UT(90,49)-(179,59),PP,PSET:PLAY"
D":PUT(90,48)-(179,58),QQ,PSET:P
LAY"D":PUT(90,49)-(179,59),PP,PS
ET:NEXT
560 PLAY"V15":FORXX=1TO14:PLAY"V
-L255O3AD":NEXT:DRAW"BM100,70U6D
6R4BR2U6R4L4D3R3L3D3R4BR4H2U4D4F
2E2U4BR2R4L4D3R3L3D3R4BR2U6D6R4B
R4H2U2E2BR4D6L2R4L2U6G1E1D3BR4R4
BR2BD3R4U3L3R3U3L4BR6F2D2G2"
570 PLAY"V15":A$=INKEY$:IF A$<>"
"THENFORXX=1TO14:PLAY"V-AD":NEXT
580 IF A$="1"THENO=.3ELSEIFA$="2
"THENO=.5ELSEIFA$="3"THENO=.8ELS
EGOTO 570
590 COLOR0:LINE(90,49)-(179,70),
PSET,BF:M=1
600 GOTO 630
610 '
620 ' PLANE
630 A=A-3:PUT(A,10)-(A+39,24),CC
,PSET
640 PLAY"V15O1L255G"
650 IF A<7 THEN COLOR0:LINE(A,10
)-(A+39,24),PSET,BF:D=0:A=215
660 P=PEEK(65280):IF P=126 OR P=
254 THEN E=A+15:B=20:COLOR 0:LIN
E(A,10)-(A+39,24),PSET,BF:GOTO 7
00
670 GOTO 630
680 '
690 'MEN
700 A=JOYSTK(0):B=B+5:PUT(E,B)-(
E+15,B+13),AA,PSET:IF A<10 THEN
D=D-.4 ELSE IF A>53 THEN D=D+.4
710 E=E+D:IF D<-3.6 THEN D=-3.6
ELSE IF D>3.6 THEN D=3.6
720 IF PPOINT(E+5,B+19)=5 OR PPO
INT(E+10,B+19)=5THEN1200
730 P=PEEK(65280):IF P=126 OR P=
```

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```
254 THEN 780
740 GOSUB 870
750 GOTO700
760 '
770 ' PARACHUTE
780 IF D>=0.1 THEN PUT(E-8,B+4)-
(E-4,B+14),DD,PSET ELSE IF D<=-.
1 THEN PUT(E+12,B+4)-(E+16,B+14)
,DD,PSET
790 A=JOYSTK(0):AB=JOYSTK(1):IF
AB<32 THENB=B+1 ELSEB=B+3
800 IF PPOINT(E+7,B+20)=5 OR PPO
INT(E+8,B+20)=5 THEN 1280 ELSE I
F PPOINT(E-5,B+14)=5 OR PPOINT(E
+13,B+14)=5THEN1200
810 PUT(E-4,B)-(E+12,B+20),BB,PS
ET:IF A<10 THEN D=D-.4 ELSE IF A
>53 THEN D=D+.4
820 E=E+D:IF D<-3.6 THEN D=-3.6
ELSE IF D>3.6 THEN D=3.6
830 GOSUB 870
840 GOTO 780
850 '
860 ' MISSILE
870 IF E+8<E1 THEN EE=EE-O ELSE
IF E+8>E1 THEN EE=EE+O
880 IF B<B1 THEN BB=BB-O ELSE IF
 B>B1 THEN BB=BB+O
890 HH=FF:II=GG:FF=E1:GG=B1:E1=E
1+EE:B1=B1+BB
900 IF BB<-6 THEN BB=-6 ELSE IF
BB>7 THEN BB=7
910 IF EE<-6 THEN EE=-6 ELSE IF
EE>6 THEN EE=6
920 COLOR0:LINE(HH,II)-(FF,GG),P
SET
930 IFPPOINT(E1,B1)=5 ORPPOINT(E
1+2,B1+2)=5 ORPPOINT(E1+2,B1-2)=
5 ORPPOINT(E1-2,B1+2)=5 ORPPOINT
(E1-2,B1-2)=5 THENGOSUB1090
940 COLOR1:LINE(FF,GG)-(E1,B1),P
SET
950 RETURN
960 '
970 ' SCREENS
980 CE=13:CF=81:IF G1=1 THEN COL
OR0:RETURN ELSE RETURN
990 CE=19:CF=112:IF G2=1THENCOLO
R0:RETURN:ELSERETURN
1000 CE=45:CF=169:IF G3=1THENCOL
OR0:RETURNELSE RETURN
1010 CE=97:CF=174:IF G4=1THENCOL
OR0:RETURN ELSE RETURN
1020 CE=211:CF=164:IF G5=1 THENC
OLOR0:RETURNELSERETURN
1030 CE=15:CF=161:IF I1=1THEN CO
LOR0:RETURN ELSERETURN
```

```
1040 CE=51:CF=141:IFI2=1THENCOLO
R0:RETURNELSERETURN
1050 CE=121:CF=175:IFI3=1THENCOL
OR0:RETURNELSERETURN
1060 CE=149:CF=173:IFI4=1THENCOL
OR0:RETURNELSERETURN
1070 CE=209:CF=124:IFI5=1THENCOL
OR0:RETURNELSERETURN
1080 '
1090 ' EXPLOSION
1100 IFE1<12THENE1=12
1110 IF B1<12THENB1=12
1120 GET(E1-12,B1-12)-(E1+13,B1+
13),LL,G:PUT(E1-5,B1-5)-(E1+5,B1
+5),HH,OR:PLAY"O1L255AAA"
1130 PUT(E1-12,B1-12)-(E1+13,B1+
13),II,OR:POKE65494,0:PLAY"V1":F
ORG=1TO14:PLAY"V+V+;D":NEXT:POKE
65495,0:PUT(E1-12,B1-12)-(E1+13,
B1+13),LL,PSET
1140 IFE=130 ANDB=25 THEN1410
1150 IF E+13>E1-12 AND E<E1+13 A
ND B+15>B1-12 AND B<B1+13 THEN 1
200
1160 E1=130:B1=13:BB=0:EE=0:FF=1
30:GG=13
1170 RETURN
1180 '
1190 ' DEAD
1200 E=E-D:COLOR0:LINE(E-4,B+3)-
(E+12,B+20),PSET,BF:COLOR1
1210 B=B+2:PUT(E,B)-(E+7,B+13),G
G,PSET
1220 IF PPOINT(E+2,B+14)=5 OR PP
OINT(E+5,B+14)=5 THEN PLAY"V15L2
00AAA":LINE(E-4,B+8)-(E-8,B+5),P
SET:LINE-(E-8,B+7),PSET:LINE-(E-
12,B+6),PSET:LINE(E+9,B+8)-(E+13
,B+5),PSET:LINE-(E+13,B+7),PSET:
LINE-(E+17,B+6),PSET:GOTO 1330
1230 GOTO 1210
1240 '
1250 ' LANDING
1260 CE=13:CF=81:GOTO 510
1270 CE=19:CF=112:GOTO 510
1280 Q=INT(E/2):Q=Q*2
1290 IF PPOINT(Q+7,B+20)=5 AND P
POINT(Q+8,B+20)=5 THEN 1330
1300 IF PPOINT(Q+7,B+20)=0 AND P
POINT(Q+8,B+20)=5 THEN 1330 ELSE
 GOTO 1380
1310 '
1320 ' INCOMPLETED MISSION
1330 DRAW"BM75,20C1R4L2U6L2R4BR2
D6U5F4D1U6BR2R4L4D6R4BR2U6R4D6L4
BR6U6F2E2D6BR2U6R4D3L4D3BR6U6D6R
4BR2U6R4L4D3R3L3D3R4BR4U6L2R4BR2
```

```
R4L4D3R3L3D3R4BR2U6R2F2D2G2L2BR1
0U6F2E2D6BR3U6D6BR3R4U3L4U3R4BD6
BR3R4U3L4U3R4BR3D6BR3R4U6L4D6BR7
U6D1F4D1U6"
1340 POKE65494,0:FORXX=1TO500:NE
XT:PLAY"V15O1L6AFAADL20":FORK=1T
O14:PLAY"V-G":NEXT:I=I-1:POKE654
95,0
1350 IF I=0THENCOLOR0:LINE(75,20
)-(184,12),PSET,BF:GOTO1670 ELSE
 FORXX=1TO3000:NEXT:SCREEN0,0:GO
TO270
1360 '
1370 ' ACCOMPLISHED MISSION
1380 DRAW"BM75,20C1U6R4D3L4R4D3B
R2R4L4U6R4BR2R4L4D6R4BR2U6R4D6L4
BR6U6F2E2D6BR2U6R4D3L4BU3BR6D6R4
BR2U6BR2R4L4D3R4D3L4BR6U6D3R4U3D
6BR2R4L4U3R3L3U3R4BR2R2F2D2G2L2U
6D6BR12U6F2E2D6BR2U6BR2R4L4D3R4D
3L4BR6R4U3L4U3R4BR2D6BR2U6R4D6L4
BR6U6D1F4D1U6"
1390 IFR=0THENIF E<28 ANDB<65 TH
EN G1=1:F=100 ELSE IFE<32 THEN G
2=1:F=200ELSE IF E<60 THEN G3=1:
F=300 ELSE IF E<112 THEN G4=1:F=
400 ELSE G5=1:F=300
1400 IFR=1THENIFE<30 THENI1=1:F=
300ELSEIFE<66THENI2=1:F=300ELSEI
FE<136THENF=400:I3=1ELSEIFE<164T
HENI4=1:F=400ELSEI5=1:F=300
1410 E=E-D:B=B-2:COLOR0:LINE(E-4
,B+2)-(E+12,B+12),PSET,BF
1420 FORH2=1TO7:FORH1=1TO5STEP.5
:PUT(E,B+12-H1)-(E+8,B+22-H1),KK
,PSET:NEXTH1:FORH1=5TO1STEP-.5:P
UT(E,B+12-H1)-(E+8,B+22-H1),KK,P
SET:NEXTH1:PLAY"O3L200V15AAA":NE
XTH2
1430 O=O+.03:H3=H3+1:IF R=0THENI
F H3=5THENH3=0:G1=0:G2=0:G3=0:G4
=0:G5=0:R=1
1440 IF R=1THEN IF H3=5THENH3=0:
I1=0:I2=0:I3=0:I4=0:I5=0:R=0
1450 FORXX=1TO800:NEXT:SCREEN0,0
1460 GOTO270
1470 '
1480 ' SCORE
1490 J=J+F:F=0
1500 A$=STR$(J):DRAW"BM209,7C5"
1510 FOR H=1 TO LEN(A$)
1520 B$(16)="BUU4ER2FD4GL2HBR4BD
"
1530 B$(17)="BRBU5ED6LR2BR"
1540 B$(18)="BU5ER2FDG4R4"
1550 B$(19)="BU5ER2FDGLRFDGL2HBR
4BD"
1560 B$(20)="BR3U6G3R4BD3"
1570 B$(21)="BUFR2EUHL3U3R4BD6"
1580 B$(22)="BU3R3FDGL2HU3E2RBRB
D6"
1590 B$(23)="BU6R4G3D3BR3"
1600 B$(24)="BR4BU2DGL2HUER2L2HU
ER2FDGFBD2"
1610 B$(25)="BUFR2EU4HL2GDFR2BRB
D3"
1620 DRAW+B$(ASC(MID$(A$,H,1))-3
2)+"BR4":NEXT:H=0
1630 IF I>1 THENFOR XX=1 TO I-1:
H=H+10:PUT(H,0)-(H+8,10),KK,PSET
:NEXT:RETURN
1640 RETURN
1650 '
1660 ' GAME OVER
1670 FORXX=1TO40 STEP.5:IF XX/2=
INT(XX/2)OR (XX-.5)/2=INT((XX-.5
)/2)THENPUT(108,XX*2)-(164,XX*2+
8),MM,PSET ELSE PUT(108,XX*2)-(1
64,XX*2+8),NN,PSET
1680 NEXT:PLAY"O2L186V15BAGFEDC"
1690 P=PEEK(65280):IFP=126OR P=2
54 THEN RUN
1700 GOTO 1690
```

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Help Is Just a SIG Away

By Cray Augsburg
Rainbow Technical Editor

The major reason for any telecommunications network to exist is to promote the transfer of information between individuals and groups of individuals. If we take this thought one step further, we see that the purpose of SIGs, or Special Interest Groups, is to offer a place for information transfer between those sharing a common interest, be it a pastime, hobby or even a job.

On Delphi, we see many different SIGs. There are SIGs for the users of Atari computers, MS-DOS computers and many more. There are even SIGs for non-computer interests such as science fiction. From this, it follows that a SIG is a gathering place. It is a place to offer information and a place to seek information. It is a place we can turn to when we need help on a given subject. But then, what are we to do if we need help finding help? How many of you have logged into the CoCo SIG with a burning question and found you were unable to properly leave a message with a question for other users?

All CoCo SIG users start at the same point; they have a million questions about how to get around the SIG and very little knowledge about how to ask those questions of other users.

How to Ask a Question in the SIG

The first time you log onto Delphi, after a brief tour with "Max," the system tour guide, you will find yourself at Delphi's main menu. You will see the prompt `MAIN>` on your screen. At this point, type `GROUP CO` and press ENTER. This command line will take you right past the Delphi `GROUPS` menu directly into the CoCo SIG. You will know you are in the CoCo SIG because the prompt at the bottom left of your screen will now read `CoCo Sig>` and you will see a menu of options.

One of the options on the CoCo SIG menu is Forum (messages). Keep in mind, on Delphi you only need to enter the first few characters of any option for that option to be enabled. Only those characters that make the option unique from any other available selection are necessary. So, if you type `FORUM`, or just `F`, and press ENTER, you will be taken to the public message area of the CoCo SIG.

Once you are in the Forum, you are ready to leave your questions. It is advisable that new members first leave a Forum message announcing themselves as such. In this message, you can leave those all important first questions. These questions will be answered by the staff or by other users who have already

---

Cray Augsburg is RAINBOW*'s technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Ky. His username on Delphi is* RAINBOWMAG.

DATABASE REPORT

Both the CoCo SIG and OS-9 Online have celebrated major landmarks within the last few weeks. On the new OS-9 Online service, we logged our 1,000th message and, on the CoCo SIG, we celebrated passing Forum message number 25,000 just a few days before I sat down to write this report.

I am delighted to announce that thanks to a recent revision of Delphi's system software, our members can now see what the "download count" is on files in the database. On both the CoCo SIG and OS-9 Online, typing `DIR /FULL` when in a topic area in the database will show you how many times a file has been accessed. Download counts should also be visible when you are reading a set of files in a given group.

Please note that sometimes, when groups are revised or updated, download counters may get reset. Also, when looking at the download counts in the OS-9 Online database, you must remember that the OS-9 Online service has only been in existence for a few months, so the download counts are not likely to be very large yet. In addition, please understand that a large download count does not necessarily guarantee that a file will be desirable, nor does a small download count necessarily indicate a file is *not* desirable. Nevertheless, all of us on staff have long felt that those who do us the kindness of uploading files to the database have a right to be able to see just what sort of activity their files are generating, and that members looking for material to download are also quite interested in that information.

OS-9 Online Databases:

This past month we have had a number of new files in the OS-9 Online database. In the General database section, **Chuck Hoffman** (CHOFFMAN) has given us a text file on how to set up a double-sided boot disk under OS-9 Level II, using the *Rogue* distribution disk. In the file *Pointer Icons in Level II*, **Rick Adams** learned their way around the CoCo SIG.

To actually leave a message, at the `FORUM>` prompt, type `ADD` and press ENTER. At the `TO:` prompt, you are asked who you want to leave a message for. Type someone's username or, to default to `ALL`, just press ENTER. The next prompt will ask for the subject of the message. Give a brief (20 characters or so) idea of what the message refers to and press ENTER. Next, Delphi will ask you for the topic of the message. At this point, type `GEN` (which stands for General Information) and press ENTER.

At this point, Delphi will tell you to enter the text of the message; use CONTROL-Z to exit or CONTROL-C to abort. Go ahead and introduce yourself and ask all the questions you need to. Pace yourself in the question area, though. Many first-time users ask the question, "How do I download programs?" You must understand that a bit more knowledge of the system is necessary before a member can learn how to download or upload.

When entering your message, this general rule should be followed: After you have typed enough characters to nearly fill one line of text on your CoCo's screen, press ENTER and continue your text on the next line. This helps in formatting the message for other users. You should be able to backspace to correct mistakes but, if you feel you have made too many, press CONTROL-C and you will abort the message process. No message will be sent, and you will find yourself back at the `FORUM>` prompt ready to try again.

When you have finished your message, sign it with your real name. Press CONTROL-Z and the message will be added to the others in the Forum area. Note the message number and then read that message to see what it looks like.

Now, you can go off and "play around." Experiment and see what features are to be found. Keep in mind, using CONTROL-Z will back you out of nearly anything you get yourself into. Just enter them one at a time and watch for the familiar `CoCo Sig>` prompt. If you are online during the late evening hours, it is very likely your message will be answered within half an hour. So, you might want to stop back into the Forum area and see if you have gotten a response.

Go to the Forum area, as described above. If someone has replied to your message, you will be told you have waiting messages. Just type `READ WAITING` and press ENTER. Pretty soon, the answers to your questions will be scrolling by on the screen. If, after reading a reply, you want to respond to the other user, just type `REPLY` and press ENTER. At the `TO:` prompt, just press ENTER. Delphi will know who you want to reply to.

The Forum is an excellent place to find an answer for nearly any question you have. Not only is it a good place for first-time members, it's a great resource for anyone who has a problem, or just needs a little helping hand. While more experienced users sometimes make assumptions, if you don't understand something, just ask again. Besides Forum, the CoCo SIG has many ways to help you learn the system.

Other Sources of Help

As you experiment while "learning the ropes" in the CoCo, or our OS-9 Online SIG, keep in mind that help is only a couple of keystrokes away. Typing `HELP` or a question mark at nearly any prompt will give you a chance to find out what it is you are doing, and what it is you need to do. In the Conference area, however, you need to precede the word `HELP` or the `?` with a slash. Just type `/HELP` and press ENTER.

Most of the time, once you have asked for help, you are given a list of topics to receive help with. Pick the

(RICKADAMS) describes the `stdptrs` file that will appear in the Level II distribution disk. Rick has also put up a file called *FFX2 Commands for L II BASIC09*, which describes the new commands available in the new `GFX` module.

Steve Clark (STEVECLARK) has sent us *Level 2 From Rogue*, additions to `L2CODE` and `L2ROGUE` from **Kevin Darling** (KDARLING). This concerns extracting an OS-9 Level II system from the disk with the *Rogue* game.

In the Applications section, **Dennis Weldy** (OS9ER) has generously given us an OS-9 based FORTH, including a FORTH shell, interpreter, source code for same, and a compiled version of the FORTH interpreter.

In the Utilities section, **Donald R. Grafton** (GRAFTON) has given us `SORTC`, a sort routine allowing up to 10 keys for the sort. **Bill Brady** (WBRADY) has sent us a C program to test the screen speed of your screen driver. He also has given us `SYSCALL.ASM`, which allows you to access system calls from within BASIC09 programs. **Eric Levinson** (ERICLEVINSON) has sent us a parallel ohm calculator that can calculate resistance in parallel circuits. He has also sent us a sort program that can handle up to 750 strings of 35 characters each. Eric has also given us a file called `WINDOWS`, designed to set up windows using *O-Pak*. Kevin Darling has sent us a set of six utilities for Level II that show the current active processes, module directory, memory map, system map and process DAT map, and dump selected areas of memory.

In the Telcom section, Bill Brady has sent us `BARETERM.C`, a bare-bones terminal program written in C. He's also sent us `BIGTERM.C`, source code for his *BigT* OS-9 terminal program, which I mentioned last month. He has also given us `XM18.C`, an Xmodem file server, useful for allowing someone logged into your OS-9 system to upload and download files via Xmodem protocol. **Greg Law** (GREGL) has posted `KERMIT.FIX`, Kermit Version 1.7 updates to allow transferring binary files. And **Mark Sunderlin** (MEGABYTE) has sent us OS-9 Kermit Version 1.6, source code to Kermit.

In the Graphics section, Bill Brady has given us *WizDraw*, the source code to the start-up graphics screen displayed in an OS-9 terminal program he is currently working on. This file can show you how to draw pictures under Level II OS-9. Kevin Darling has given us a *Graphicom-to-OS-9* font converter, which enables you to convert *Graphicom* fonts to fonts usable by OS-9 Level II.

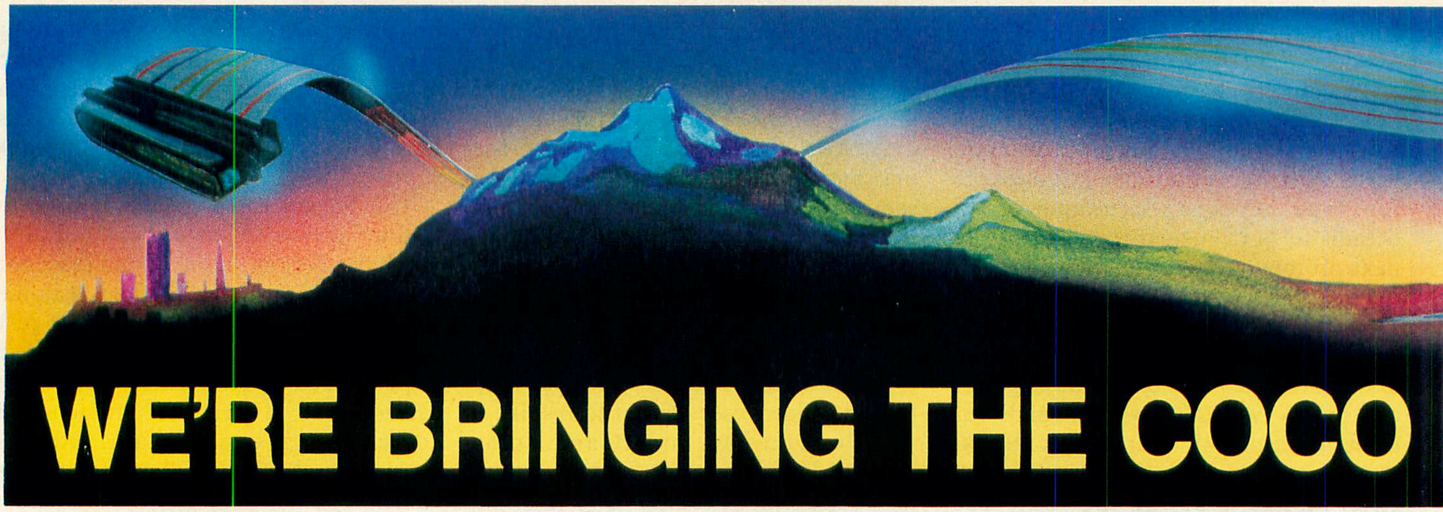
Jay Truesdale (JAYTRUESDALE) has sent us our first upload in the 68K-OS-9 section (give that boy a cookie!). This is an intra-system *Email* file, to let you send or receive mail to/from other users on your system. It works a lot like the Unix `MAIL` command.

Color Computer SIG Databases:

In the General database section, **Don Hutchison** (DONHUTCHISON) has sent us a humorous piece titled *Restroom Policy.* **Eric Robichaud** (EGROBICHAUD) has sent us a worrisome report on the relative lack of knowledge of graduating 1987 high school seniors.

In the Utilities database, **Paul J. Burke** (PJB) has sent us two astronomy programs (including a planet locater). **Steven Shimatzki** (SHIM) has given us a labeler program. **Richard Ferreira** (SKEEVE) has sent us a filing utility, and **Dennis Hoin** (HACKER1) has uploaded his *Super Disk Utility* package. **Derrick M. Kardos** (DTG) has sent us an archive utility to enable you to compress files (the way the *ARC* utility under MS-DOS works). **Andrew Ellinor** (CROPPER) has sent us a zapper program for the CoCo 3. **Alan Weston** (HEADLY) has sent us *Solarsim* for the CoCo 3.

In the Graphics section, **Mike Fischer**



RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $20 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges. If you do not maintain a positive balance, you will be charged $3.50 each month for direct billing.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Dale Puckett, Cray Augsburg, Marty Goodman, Don Hutchison, Jim Reed, Lonnie Falk and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

THE OTHER SIDE OF THE RAINBOW

On Delphi, you also are able to buy RAINBOW ON TAPE — order a whole set, or download an individual program immediately. You can also renew your RAINBOW subscription, make a fast and easy order for software or hardware from a multitude of vendors, or inquire about products on the CoCo SIG.

We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

FREE LIFETIME MEMBERSHIP

THE RAINBOW is offering subscribers a free lifetime subscription to Delphi — a $24.95 value — and a free hour of connect time — a $7.20 value at either 300, 1200 or 2400 Baud — so you can sample Delphi and the RAINBOW CoCo SIG. That's right. Your subscription to THE RAINBOW entitles you to this $32.15 value as a ***free bonus!***

If you're not a RAINBOW subscriber, just enter your order when you sign on with Delphi and you'll get the same great deal! For our $31 subscription fee, you'll get the finest Color Computer magazine ever, a free lifetime subscription to Delphi and a free hour of connect time.

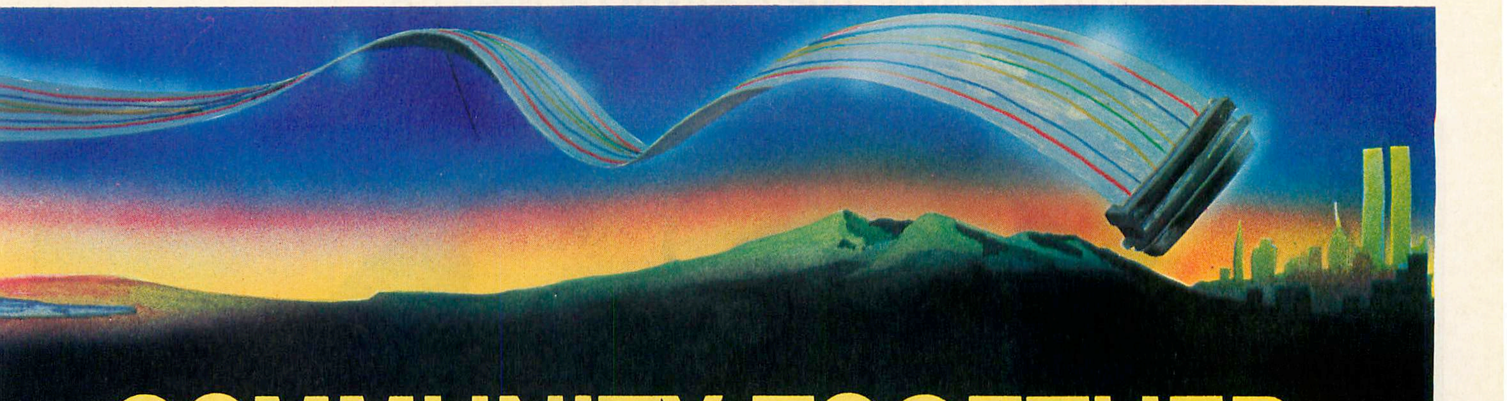
SAVE EVEN MORE

Want to save even more? While you're online you can order, for only $29.95, a deluxe package which includes the Delphi membership, the *Delphi Handbook and Command Card* ($21.95) and a total of three hours of connect time ($21.60).

Delphi provides us all with **Immediate CoCo Community**. Check it out today. After all, you can sample it for free!

Problems? Call Delphi:
(800) 544-4005
(617) 491-3393

DELPHI TYPE:
GROUP COCO



COMMUNITY TOGETHER

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks like Telenet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Telenet or Tymnet. Canadian residents using Datapac will be charged an additional $12 (U.S.) per hour.

On Telenet: The Uninet network has now merged with Telenet. To get the Telenet number for your area, call (800) 336-0437. After you call your local access number and make connection, press the ENTER key twice. When the "TERMINAL=" prompt appears, press ENTER again. When the "@" prompt appears, type `C DELPHI` and press ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER. Delphi's new rates indicate an additional $12 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Telenet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 312561703088 through Telenet, or 310600601500 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `JOINDELPHI` and press ENTER. At the "PASSWORD:" prompt, type `RAINBOW`. Then, at the "NUMBER:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type `JOINDELPHI` and press ENTER. At the "PASSWORD:" prompt, type `SENDRAINBOW` and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just press `ENTER` and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

Come Visit Us! Type: `GROUP COCO`

After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password. No time is assessed against your free hour of service while you answer these questions.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen username and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it.

After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

Also from Falsoft, The RAINBOW MAKER, . . .

The magazine for Tandy portable and MS-DOS users

Not only does Tandy produce our favorite CoCo, we think they produce the best and best-priced laptop portable and MS-DOS computers as well. We've found that when satisfied Color Computer users decide to add portability or move to MS-DOS, many stick with Tandy. For these people we publish PCM, The Personal Computer Magazine for Tandy Computer Users.

Each month in PCM, you'll find information and programs for the Tandy 100, 102, 200 and 600 portable computers. And you'll find even more coverage for their MS-DOS machines, the 1000, 1200, 2000 and 3000, along with the great new 1000 EX, 1000 SX and 3000 HL.

FREE PROGRAMS!

We learned from THE RAINBOW that readers want programs to type in, so each month we bring you an assortment of them: games, utilities, graphics, and home and business applications.

BAR CODE LISTINGS AND PROGRAM DISKS!

For portable users, PCM is the only home computer publication in the world that brings you programs in bar code, ready to scan into memory like magic with the sweep of a wand! For those who don't have time to type in listings, we offer a companion disk service with all the programs from the magazine.

TUTORIALS AND PRODUCT REVIEWS!

As if all this weren't enough, we offer regular tutorials on telecommunications and hardware; assembly language, BASIC and PASCAL programming tips; and in-depth reviews of the new software, peripherals and services as they are released. Add it all up and we think you'll find PCM to be the most informative and fun magazine for this market today!

To order by phone (*credit card orders only*) call 800-847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call 502-228-4492.

☐ YES! Please send me a one year (12 issues) subscription to PCM for only $28.* A savings of 22% off the newsstand price.

For greater convenience, order a PCM Subscription through the shopping area of the CoCo SIG of Delphi!

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Acct. # ____________________ Expiration Date __________

Signature ______________________________

*Canadian subscribers U.S. $35. Surface rate elsewhere $64, airmail $85. Allow 6 to 8 weeks for first copy. Kentucky residents add 5% sales tax. **U.S. currency *only*, please.**

***Mail to:* PCM, The Falsoft Building, P.O. Box 385, Prospect, KY 40059**

appropriate selection. Once you have finished, you usually will be asked if you want further help on a related subject or subtopic. When you are satisfied, just press CONTROL-Z.

If you type `HELP` at the `CoCo Sig>` prompt, or main SIG menu, you will be greeted by a `HINTS>` prompt. This section of the SIG contains several text files pertaining to several different aspects of SIG operation. To get a list of the available help files, just type `SCAN` and press ENTER. You will find references to topics ranging from "Disabling Call Waiting" to "Submitting a File." While you may not be quite ready for some of the selections, many of the help files are intended for new users. When you come across an entry of interest, enter the number associated with that entry. You will then be able to read the given help file. As before, when you are done, a simple CONTROL-Z is all that is needed to return you to the SIG menu.

Some General Notes About Help

Many present members of the CoCo SIG are more than willing to lend a helping hand at any time. However, we sometimes make assumptions about how much another person knows. Things second nature to us tend not to be mentioned in our explanations. If you don't quite follow something, don't be afraid to ask again. The most important thing is that you, too, become familiar with the system.

The users on the SIG have a wide variety of other interests. You should refrain from asking a specific person about a specific problem unless you know that person is knowledgeable in that area. It is best to address most questions to *all* users. That way you can get a variety of viewpoints. □

(MIKE88) has sent us an Old English font. **Ken Schunk** (KENSCHUNK) has sent us several CoCo 3 Hi-Res fonts, including a Saratoga, Palo Alto, IBM, and a Woodhaven font set. **Alan Dekok** (ALANDEKOK) has uploaded a tape covers program, and **Roger Smith** (SMUDGER) has sent us `DIGIT.BAS` for the CoCo 3. Don Hutchison has provided `PIC DOS`, a picture saver for the CoCo 3, and **Roger Bouchard** (HARBIE) has sent us some stunning Atari 520 ST pictures that were converted to CoCo 3 format.

In the Data Communications section, we have a text file by **Ward Christenson** on the specs for Xmodem, with some addenda by **Mike Ward** (MIKEWARD). For *MikeyTerm* users with a tape-only system, we have gotten a proper copy of `TAPCNV.BAS`, to aid such folks in downloading ML program files.

In the CoCo 3 News and Information section, **Rich Ries** (RRIES) has sent us `SEEK.BAS`, a CoCo 3 disk editor program. **Robert E. Pierce** (RPIERCE) has sent us a character editor for the CoCo 3 Hi-Res fonts. **Chad Rogers** (ICMR) has sent us a very professional and thorough 128K / 512K CoCo 3 RAM test program.

In the Product Reviews section, we have from **Harry Seely** (ALTAIR) a review of the the J&R systems 512K upgrade board. I posted an extensive comparative review of the CM8, Magnavox 8CM515, and Sony KV1311CR RGB monitors for the CoCo 3, including information on prices and where to get these monitors.

In the Games database, **Dr. Michael Keyes** (MIKEYES) has sent us a Green Beret Simulation. **Eric Levinson** (ERICLEVINSON) has sent us a *Blockman* game. **Craig Green** (SPUDLY) has provided a Lotto 40 and 48 game. **Kurt Stecco** (HIGHRAILER) has sent us the game *Local Freight*. **Richard P. Trasborg** (TRAS) has sent a blackjack game. And **Steve Macri** (DRACMAN) has sent us a drag racing game called *Dragn3*.

Over this last month, our forums on the CoCo and OS-9 services have been buzzing with anticipation of the long-delayed release of OS-9 Level II. As I write this report, the first release copies are just being sold in the Fort Worth area, with the product available elsewhere within a week or two. By the time you read this, OS-9 Level II will be at your local Radio Shack computer store. With the arrival of this product, I expect to see a great deal of activity in both the forums and databases.

For Disk Extended Color BASIC users, there seems to be a good chance that a new release of *RickyTerm* will soon be available, which will support the bit-banger port and have a few other improvements.

Corrections

In the March 1987 "Database Report," I incorrectly stated that `HCOPY` was a BASIC Driver for Greg Geary's Hi-Res utility. This is not the case. It is a BASIC driver for an ML program developed by Dennis Weldy. Please excuse this mistake.

Also, I want to point out to our readers that it was Vaughn Cato of Atlanta, Ga., who wrote the superb Bouncing Ball Demo that Mike Fischer uploaded to us. Our special thanks to Vaughn for this outstanding program, which can be found in the Graphics section of the CoCo SIG's database.

How to stay in touch with the most recent developments relating to the CoCo? Just drop by the Delphi CoCo and OS-9 Online Special Interests Groups now and then! I'll see you all there.

— Marty Goodman
Rainbow's Delphi Database Manager

Hint . . .

RGB Shortcut

The manual that accompanies your CoCo 3 indicates you should enter `PALETTE RGB` upon powering up if you have an RGB monitor. To make life a little simpler, just type `RGB` and press ENTER. The command `PALETTE` is not required to precede the selection of `RGB` or `CMP`.

David Mills
Huntington, WV

Hint . . .

X Marks the Spot

Most CoCo enthusiasts know about sending a disk directory to the printer; just enter `POKE111,254:DIR`. In "RENUM With a Twist" [February 1986, Page 112], Frederic Haberer explains how to use the `RENUM` command to find `GOTO` and `GOSUB` statements that don't go anywhere. To find these unresolved references, enter `RENUMx,x,10`, where *x* is any number greater than the highest line number and less than 65535. A list of the errors will then appear on the screen. Now, I combine the two techniques to send the results to my printer. Just enter `POKE111,254:RENUMx,x,10`.

John Valentine
Pacoima, CA

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

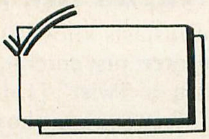
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS,* type in the program and save it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so you can operate them.

The easiest way is by using an editor/assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into the CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip, which controls your computer.

When using an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN or EQUATE statement. In short, you have to know something about assembly to hand-assemble some programs.

Use the following program if you wish to hand-assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of I to &H7F80.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

DataPack II Plus V4.1

SUPER SMART TERMINAL PROGRAM
AUTOPILOTand AUTO-LOG Command Processors
X-MODEM DISK FILE TRANSFER SUPPORT
VT-100 & VT-52 TERMINAL EMULATION

- No lost data using Hi-Res Display, Even at 1200 Baud on the Serial port.
- 9 Hi-Res Displays, 28 to 255 columns by 24 lines & true Upper/Lower case.
- 45K Text Buffer when using the Hi-Res Text Display and Disk .
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file while online.
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys & position, insert/delete, PF & Alt. Kbd. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates 300 to 9600.
- Complete Full and Half Duplex operation, with no garbled data.
- Send full 128 character set from Keyboard with control codes.
- Complete Editor, Insert, Delete, Change or Add to Buffer.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 Baud.
- Send Files directly from the Buffer, Macro Key Buffers or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On line with no loss of data.
- Built in Command Menu (Help) Display.
- And much, much more.

Supports: Word-Pak I, II, R.S. and Double Density 80 Column Cards
Disto Controller w/80 column card & parallel printer
PBJ Parallel Printer Card and Dual Serial Port (2SP-Pak)
R. S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 32K & Disk, Only $59.95

HI-RES II Screen Commander

Tired of looking at the 16 line by 32 character display on your CoCo? Wish you could see more lines and characters? Then HI-RES II is the answer, it can give you the big screen display you've always wanted. It will display 24 lines of 32, 42, 51, 64 and even 85 true upper and lower case characters per line without extra hardware.

HI-RES II is the most powerful screen enhancement package available for the Color Computer, yet it is the least expensive. It is completely compatible and transparent to Basic. Once the program is loaded, everything works the same as before, only you have a much better display to work with. It even allows you to have mixed text and Hi-resolution graphics on the same screen or have separate text and graphics screens. It also has an adjustable automatic key repeat feature and allows you to protect up to 23 lines on the screen.

HI-RES II features over 30 special control code functions that allow you to change characters per line, protect display lines, change background color, position cursor, switch normal/reverse video, underline, double size characters, erase line/screen/to end of screen, home cursor, character highlight and much more. It works on all models of the CoCo with 16, 32 or 64K and provides automatic reset control so HI-RES II won't disappear when you press reset.

Only 24.95 on Tape or $29.95 on Disk

"The Source"

Now you can easily Disassemble Color Computer machine language programs directly from disk and generate beautiful, Assembler Source Code. And "The Source" has all the features and functions you are looking for in a Disassembler.

- Automatic Label generation and allows specifying FCB, FCC and FDB areas.
- Disassembles programs directly from Disk or ROM.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk. or a printed listing.
- Generated source files are in standard ASCII format.
- Built in Hex/ASCII dump/display to locate FCB, FCC and FDB areas.
- Built in Disk Directory and Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
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"The most complete Editor/Compiler I have seen for the CoCo... "
--The RAINBOW, March 1986

CBASIC is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocation and so on, because CBASIC will do it for you automatically. Or, CBASIC will let you control every aspect of your program, even generating machine code directly in a program easily.

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CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing and editing Basic programs. It has block move & copy, program renumbering, automatic line numbers, screen editing, printer control and more.

"The Editor is a very good one and could be the subject for review all by itself..." --The RAINBOW, March 1986

"Comparing ECB's edit mode to CBASIC's text editor is like comparing a World War II jeep to a modern sedan. Both get you to your destination, but what a difference in the ride. -- Hot CoCo, Feburary 1986

The documentation for CBASIC is an 8 1/2 * 11 Spiral Bound book which contains approximatly 120 pages of real information.

"CBASIC's manual is easy to read and written with a minimum of technicalese. " --Hot CoCo February , 1986

The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. Compare the performance of CBASIC against any Color Basic compiler. Dollar for dollar, CBASIC gives you more than any other compiler available. Requires 64K & Disk, not JDOS compatible.

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"A Complete Editor/Compiler Well Worth its Price" --RAINBOW March 1986

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EDT/ASM 64D is a Disk based co-resident Text Editor & Assembler. It has a Hi-Resolution 51, 64 or 85 column by 24 line display, so you see your program listings easily and it supports Column cards. The disk also contains a free standing ML Debug Monitor, to help you debug your assembled programs.

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- Full screen line editing with immediate line update.
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Corrections

"Instant Graphics and Hogs in Space" (February 1987, Page 106): Due to a production error, part of Line 730 is missing from the listing as it appeared in the magazine. The entire line appears below.

```
730 S=PEEK(&HBC)*256:PCLS2:SAVEM
"CHECK",S,S+1024*3-1,&HA000:PMOD
E4,1:COLOR1,0:SCREEN1,1:PCLS:LOA
DM"CHECK":KILL"CHECK/BIN"
```

There is no problem with the program as it appears on RAINBOW ON TAPE and RAINBOW ON DISK.

"Let the Laser Battle Begin" (January 1987, Page 36): When going through the tunnel in *Def Mov*, it is not possible to crash. This can be rectified by changing every occurrence of `=1` to `=5`. This allows the color codes to be read properly.

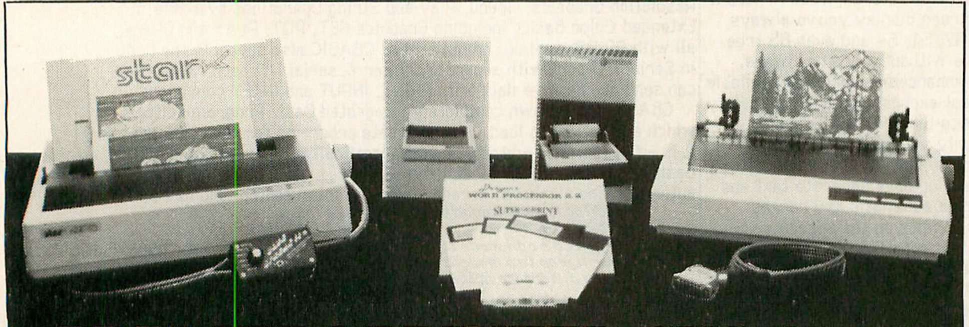
"Joker Poker" (March 1987, Page 99): While no known error exists in the program, several readers have had difficulty understanding one aspect. The first time you run *Poker*, you will get an error message. This message asks if you entered `F$="SCORES":GOTO2125` to establish a scores file. All you need to do is make sure you have a formatted, non-write-protected disk in Drive 0 and enter the above line. This will create the score file necessary for game execution.

"The Key to Success" (March 1987, Page 66): The program *CoCo-Type* by Leonard Hyre contains a line that may be confusing to those who are typing the listing from the magazine. Line 1550 is an extraneous line. It can be removed from the program without affecting program execution.

"'Life of the Party' for $200, Please" (March 1987, Page 58): The part number designations are not indicated in Figure 1, the parts list. The correct designations are as follows:

J1	—	6-pin DIN plug
SW1-SW10	—	momentary switches, normally open
R1-R9	—	10K ohm, ¼-watt resistor
R10	—	22K ohm, ¼-watt resistor
R11	—	220K ohm, ¼-watt resistor

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` at the CoCo SIG> prompt and `INFO` at the TOPIC?> prompt.



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Reviewed in '87 March Rainbow

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REVIEWING REVIEWS

Keeping Track

Editor:

I must assume someone spent 10 minutes cranking out a review of a few hundred words that failed to provide an accurate personal account of *Keeping Track*'s uses (March 1987, Page 142). I am particularly dismayed to realize the reviewer used 5-year-old technology to test a current utility program. The `PCLEAR 1` bug has not occurred on any of the CoCos (both 2 and 3) in use throughout our company.

A comparison was drawn between Directory Print and the "bare bones" command `POKE 111,254:DIR`. The versatile aspect of the CoCo means there is always more than one way to do any task, but methods can only be compared if they produce identical results. There is sufficient foolishness in this review to write several pages of rebuttal; however, enough is enough. Paying customers are the least forgiving, but none of them have ever come to us with any complaints about *Keeping Track.*

Ian Millard
Duck Productions

Editor:

Having read the review of *Keeping Track* in March 1987, I feel there are a number of misconceptions that should be cleared up.

First, D is a high-speed machine language program with a BASIC loader that allows the use of the command `RUN"D`. The D program automatically loads and runs any file, machine language or BASIC. D gives continuous access to any length of directory and indicates the number of granules in each program, as well as the free disk space and users disk names — in less than four seconds.

Second, the speed of Disk File Address, like so many other programs, is dependent upon the printer baud rate and, therefore, the speed of data transfer.

Third, Directory Print does not bomb out. When using the command `PCLEAR 1` (not `PCLEAR 0`) in a program, the ROMs in some computers produce an SN Error. It has never happened on any of the CoCo 2 or CoCo 3 machines here but, when it does crop up, it is generally attributed to Extended Color BASIC, not the many programs that use `PCLEAR 1`. Directory Print automatically formats and prints up to eight disk directories on a single 8½-by-11 page.

Fourth, the line-list protection is a remnant of a copy-protection system that Duck Productions no longer uses. The `DIR` and `LIST` commands can be hobbled on any computer by `POKE 383,158` and restored to operation by `POKE 383,57`.

When summing up any software package, it is important to keep in mind the type of user it is aimed at. *Keeping Track* was designed for the average person, who wants a maximum of organization with a minimum of effort. With this in mind, *Keeping Track* has been permanently re-priced at $14.95 ($19.95 Cdn.). I am sure the more technical types who repair their own disk drives, etc., will be buying much more detailed (and expensive) utilities.

I am disappointed with the apparent lack of attention to detail in this review. This is not sour grapes by any means. On the contrary, I am always looking for constructive criticism and suggestions on how to improve my work.

Gary Mills
Author

Colorscan

Editor:

I would like to thank reviewer Gay Crawford for her thorough and favorable review of our program, *Colorscan*, for the CGP-220 Color Ink-Jet printer.

However, there are several things that I would like to comment on. First, the maximum banner length is 27 feet, not 27 inches. Second, the program will work with ADOS if the ADOS `DISABLE` command is used.

It was also noted in the review that to exit the program you must press the reset button or turn off the machine. This is true. But, this has been the case with all WHITESMITH software, and we have never received any complaints before.

Eric White
WHITESMITH Partnership

CMOS Conversion Kit

Editor:

Marty Goodman's review of the 63B09E and 63B21 chips deserves comment. He was right to say that these products are not meant for the casual tinkerer. They are too expensive for all but the most specific applications. It's difficult to install them in the CoCo 3 unless you have experience in desoldering chips. Furthermore, he was right to say there is currently no provision for adding a portable disk drive.

What Marty doesn't realize is that a couple of chips and a battery aren't meant to turn the CoCo into a laptop computer that will handle the spreadsheets and word processing tasks of typical users. Thumb through RAINBOW, however, and you'll see the CoCo harnessed for robotics, music synthesis and MIDI control, and signal processing, including speech recognition. In many cases, these functions are needed where an AC cord won't easily go.

Marty complained about the introductory price, but he'd have to buy several hundred dollars worth of other items before he could buy these chips in single quantities. Most likely, his distributor, like mine, would balk until he put in a minimum order. However, I've reduced the prices to $34.95 for the CPU and $12.95 for the PIA. But again, these chips are not meant for inexperienced tinkerers.

Mitch Gould
CMOS Conversions

RECEIVED & CERTIFIED

The following products have recently been received by THE RAINBOW, examined by our magazine staff and approved for the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

This month the Seal of Certification *has been issued to:*

Checkbook III, a financial program designed to aid in checkbook maintenance. This program maintains current balance, tracks checks written, and allows the user to catalog each check into one of nine expense categories. For the CoCo 3. Requires one disk drive. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236, $19.98 plus $3 S/H.*

Checkerboard Filesort, a 32K filing program. Machine language routines handle data entry, editing, reviewing, searches and sorting. For the CoCo 1 or 2. *Seibyte Software, Box 6464, Bakersfield, CA 93386; (805) 366-4540, Tape only, $16.95.*

CoCo3 Cribbage, a 128K graphics version of the classic card game. Enjoy the game and learn about CoCo 3 programming. For the CoCo 3. *Bob van der Poel Software, 17435 57th Avenue, Edmonton, Alberta, Canada T6M 1E1; Disk, $13.95; Tape, $14.95.*

CoCo Checkbook, a 16K program to track expenditures, both by check and cash, by category or account, and to make using a budget easier. For CoCo 1, 2 or 3. Requires one disk drive. *Bob's Software, P.O. Box 391, Cleveland, OH 44107; $25 plus $2.50 S/H.*

CoCo MIDI 2, a 64K program for musicians. Let your CoCo talk to your MIDI music synthesizer. Includes MIDI hardware interface, 2 MIDI cables, detailed manual and software. For the CoCo 1, 2 or 3. Requires Y-Cable or Multi-Pak. *Speech Systems, 38 W. 25 Deerpath Road, Batavia, IL 60510; (312) 879-6880, $149.95.*

Diskman, a 32K utility program for the disk drive user. Make backup directories, restore lost directories, examine and change sectors, and restore and alphabetize directories. *Tothian Software, Inc., Box 663, Rimersburg, PA 16248; $21.95.*

FKEYS III Version 1.3, a 128K function key utility. *FKEYS III* can be programmed for 20 different functions. Custom versions can be saved to disk and loaded into RAM. For the CoCo 3. *Gimmesoft, 4 Hallfield Court, Baltimore, MD 21236; (301) 256-7558, $19.95 plus $2.50 S/H.*

Gridiron Strategy, 128K football Simulation game. For the CoCo 3. Requires one disk drive. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615; (419) 389-1515, $29.95.*

HR-1, a collection of three Ham radio programs. The Morse code program is designed as a practice aid. An antenna design program calculates the length and spacing of a side-spaced Yagi antenna up to four elements. A DX station program allows typing notes onto the screen and then looking up the countries for a given prefix. For the CoCo 1, 2 or 3. *Dynamic Electronics, Inc., P.O. Box 896, Hartselle, AL 35640; (205) 773-2758, $11.95 plus $3 S/H.*

IMML3, a 128K mailing list program that will handle up to 200 records in a file. Features onscreen editing and ML sorts on any field. For the CoCo 3. *CMD Micro Computer Services Ltd., 10447 124th Street, Edmonton, Alberta, Canada T6M 1E1; (403) 488-7109, $16.45 plus $2 S/H.*

The Levitical Offerings, a Bible study program. The disk includes five studies on the offerings in Leviticus, and the entire King James text of the passages studied. For the CoCo 1, 2 or 3. *Sovereign Grace Software, 221 Highview Drive, Ballwin, MO 63011; (314) 227-3238, $9.95 plus $2.50 S/H.*

RAINBOW CERTIFICATION SEAL

Magazine Index System 2.0, a 16K database program to catalog magazine articles. This new release maintains all the features of the original. Also supports multiple drive systems, allows searches on both description and source fields, and has faster search algorithms. For the CoCo 1, 2 or 3. *CMD Micro Computer Services Ltd., 10447 124th Street, Edmonton, Alberta, Canada T6M 1E1; (403) 488-7109, $14.95 plus $2 S/H.*

Multi-Label III, a 128K label creating program. Features include 40-by-24 or 80-by-24 Hi-Res text screen, F1 upper-/lowercase toggle, F2 40/80 column toggle, multiple printer codes, error-trapping and break-trapping. For the CoCo 3. *Gimmesoft, 4 Hallfield Court, Baltimore, MD 21236; (301) 256-7558, $14.95 plus $2.50 S/H.*

RGB Patch, a program designed to take CoCo programs that display black and white on RGB monitors when using the CoCo 3 and fix them to display in color. *RGB Patch* will not work for ROM packs, programs that run under OS-9 or BASIC programs. Works on most machine language programs loaded by `CLOADM`, `LOADM`, `DOS` or `RUN`. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; (718) 835-1344, Disk only, $24.95 plus $3 S/H.*

Roller Controller, a 128K arcade-type game that includes six different screens and three skill levels. Colored marbles start at the top of the maze and roll down the planks. The object is to guide the marbles into the correct color bin by opening and closing the trap doors. For the CoCo 3. *Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; (718) 835-1344, $29.95 plus $3 S/H.*

VCR Database & Mini Title Screen Maker, 64K Disk programs for cataloging and printing out VCR tape data, and personalizing VCR tapes. For the CoCo 1, 2 or 3. *SECA, P.O. Box 3134, Gulfport, MS 39505; (601) 832-8236, $20.98 plus $3 S/H.*

Video Titler Version 2.0, a program to generate an opening slate for videotaped programs or movies. Information about the upcoming production is displayed on the TV screen and is recorded for a short time by the VCR. For the CoCo 1, 2 or 3. *Griffin Enterprises, Box 6104, Sumter, SC 29150; (803) 773-8275, $10.*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

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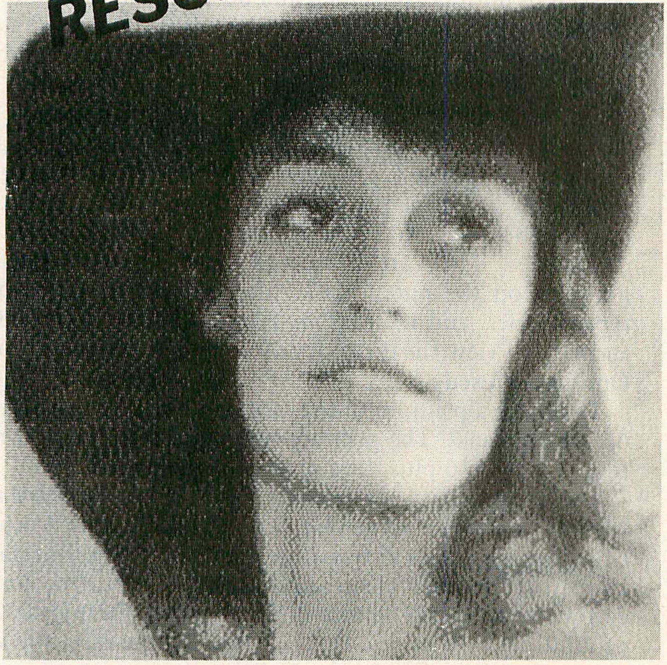

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The program is written for a minimum 32K CoCo. It is supplied in disk form only and, though written for a Radio Shack printer, can be easily modified for any printer. I ran the program on my CoCo 3, RS-DOS disk system, and an Epson FX-80 printer with no problems.

Upon running this BASIC program, a menu with nine options is presented. Option 1 makes a backup directory either on the same disk you are working with, or on a separate disk. If the backup is produced on the same disk, it uses up two granules of space, leaving 66 free granules for storage. If the backup directory is placed on a separate disk, it not only avoids using the space on the parent disk, but provides a dedicated disk upon which all directories can be stored, maintained and viewed.

Option 2 provides the means for restoring a lost or garbled directory. The restoration can be accomplished either from a backup directory on the same disk, or from the separate directory disk. A warning sound is produced prior to accomplishment, and the instructions remind you to keep the backup directories up to date or suffer the consequences!

> ***"A warning sound is produced prior to accomplishment, and the instructions remind you to keep the backup directories up to date or suffer the consequences!"***

With Option 3 you can examine and change any sector of a disk. As the instructions say, examination is harmless enough, but you had better know what you are doing if you make changes. For this reason, another warning is sounded. Finding the track or granule is easy, requiring only a T12 (Track 12) or a G7 (Granule 7) type entry. Entering the desired sector results in the 256 bytes of that sector appearing on screen. The cursor can then be moved among the bytes with arrow keys, and the values of the bytes can be seen in both hexadecimal and decimal values. Printouts of the 256 bytes of a sector can be obtained. Pressing the E key allows you to change the value of the byte the cursor is on.

Option 4 allows directory reorganization subject to the user's desire. Option 5 alphabetizes the directory upon command. Option 6 provides for viewing the catalog of directories you have put on the separate dedicated disk. It allows the user to browse through the entire list of directories. They are presented with a number of free granules on the parent disk, file names with extensions, types of files, and whether the files are in binary or ASCII format. To view the directory of an individual parent disk, Option 7 is used.

To obtain a printout of the catolog of directories (Option 6), use Option 7. The printout will contain all the information in Option 6 plus the size of each file in granules.

The program is user-friendly and does not require any special computer expertise, except in Option 3 where changing the values of bytes may be desired. The four pages of instructions are clear and easy to follow. One minor comment: It would be nice if the program allowed the use of multiple disk drives, thus eliminating the insertion and removal of disks from a single drive.

Diskman is useful for the protection of disks and provides the ability to reorganize and keep track of disk directories. It is certainly worth its price.

(Tothian Software, Box 663, Rimersburg, PA 16248; $21.95)

— Mel Siegel

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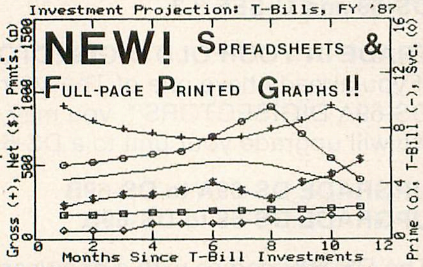

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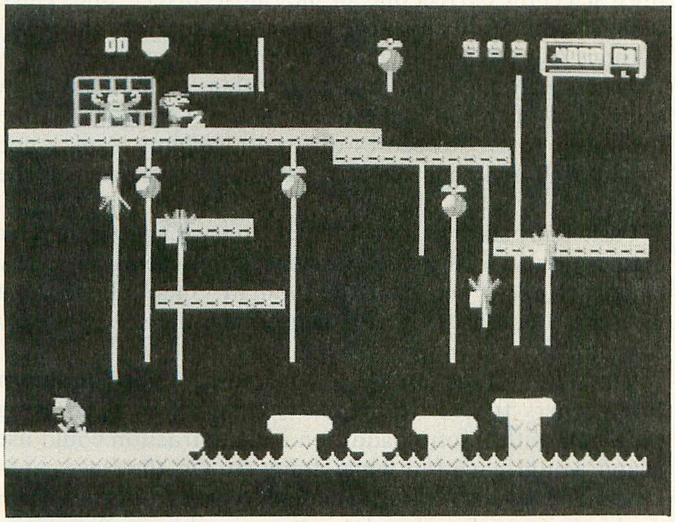
The Return of Junior's Revenge . . . This Time on the CoCo 3

Those of you waiting eagerly for a new arcade game to brighten up your CoCo 3 need wait no longer. Computerware's *The Return of Junior's Revenge* is a version of the popular arcade game "Donkey Kong Junior," and of Computerware's own *Junior's Revenge*, made especially to strut the 3's new graphics and colors. While the game isn't perfect, overall it is very good, especially considering how quickly it came out after the 3's debut.

The Return of Junior's Revenge is supplied on a copy-protected disk and loads easily into any 128K or 512K Color Computer 3. The disk is backed by a 90 day warranty; after that, you must pay $8 for a replacement if anything happens. Once the game is loaded, you have the option of using RGB (for the CM-8, Magnavox or Sony monitors) or Composite (for composite color monitors and TVs) modes.



You can play either a demo mode, in which you only lose a player by falling and your high score is not kept, or regular mode, in which you can lose a player by running into an opponent as well as by falling. In the game, you play the part of Junior, whose father, the gorilla, has been captured by Luigi. It is your job to free him, and you'll have four different screens (and many more levels) to traverse before you'll even get close.

Luigi has put your dad at the top of the screen in a cage (how humiliating!) and has sent out "Vinegators," little snapping creatures that crawl up and down the vines, to make sure nobody gets to him. But, being the ambitious little fellow you are, you're going to try. You'll have to climb up the vines, jump over the Vinegators, scurry across the platforms, hop from island to island to avoid falling in the water, and grab the key to unlock the cage. Along the way, you can touch the apples that are found on the vines and drop them on the Vinegators.

If you've managed to survive, the next stop is the chain screen. Here, you'll have to push keys into the six locks that stake your dad's cage down. But, in addition to Vinegators, you'll have to beware of the ZuZu birds. ZuZu birds fly around and try to peck Junior off the chains. The trampoline screen follows later, where you'll have to use moving chains and trampolines to swing your way up to Dad. Finally, you'll reach Luigi's Hideout. At the Hideout, conveyor belts and sparks threaten to make life hard for poor Junior. Can you guide him to the top in one piece?

The game is well-conceived and I enjoyed playing it. Using 16 colors at once and better graphics make each of the four screens come alive. Perhaps a little more time could have been spent on the graphics detail, although there is a big improvement from the CoCo 1/2 version. Most of the animation was smooth, and cute "intermission" scenes were presented between some levels.

The sound effects, while not bad, were quite annoying. I had to turn the sound down after playing for a few minutes. Also, the program does not work well with the old joysticks; I strongly recommend the deluxe joysticks.

Revenge is jolly fun to play and takes a while to master. It requires a bit of strategy — not just straight "shoot-'em-up" reflexes, although you'll certainly need a fast reaction time to survive.

I liked this game, and I recommend it to any CoCo 3 owner as a good one you'll enjoy playing repeatedly. There are minor things, such as no pause key, that are irritating, but as the first arcade game for the CoCo 3, *The Return of Junior's Revenge* is certainly a step in the right direction.

(Computerware, Box 668, Encinitas, CA 92024; 619-436-3512, $34.95 plus $2 S/H)

— Eric W. Tilenius

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Software Review

The SECA Fraction Review
Offers Help to Students

Fractions? Least common denominator? What's that? *The SECA Fraction Review* from Southeastern Computer Arts is designed to help students review fractions by allowing them to add or subtract using either single or double digit denominators. Written by Darryl W. Hawkins, the program allows the user to decide whether he or she will add or subtract fractions using common denominators or noncommon denominators. The ultimate objective is to arrive at the answer and to be sure it has been reduced to the lowest common denominator. When I tested this program, I found just how dependent upon calculators and computers I had become!

The program uses the normal CoCo screen display for the menu selection screens and score card screen. A Hi-Res screen is used for the actual test (or game, if you prefer). The Hi-Res screen is well laid out and easy to read. It is divided into three sections: the left side showing the problem, the right side showing the possible answers, and the bottom containing the number right and wrong, as well as the player's score.

Scoring consists of two values. One is calculated by dividing the number of correct problems by the total problems given and then converting to a percent. For example, eight correctly answered problems out of 10 yields a value of 80 percent. The second value is a point total for the round. Points are determined by several factors, such as the level of difficulty, the speed or length of time that it took the user to answer the problem, and whether or not help was needed to arrive at the answer. The user could play five rounds and score 100 percent on each round, yet the points awarded may be different depending on the various factors. For example, I scored 100 percent on two rounds of play, acquiring 239,947 points for one round and 239,725 points for the other round. At the end of each round of play (10 problems), the final percent and point values are displayed on the screen. Also displayed are the number of problems right with help and the number of problems wrong with help.

The author has provided two help factors for the user who gets stuck on a problem. By pressing the L key, the student can see the denominator of the answer, although this will not be the denominator of the final answer. For example, when adding $^3/_8$ and $^1/_{10}$, pressing the L key will show an answer of ?/80. The student can can see a common denominator for both fractions. If still stuck, the user can press the H key for more help. Doing this will show an answer of 38/80. However, 38/80 can still be reduced. Of the five possible answers showing on the screen, the user must select the correct one, or the "most correct" one. Thus, if 38/80 and 19/40 appear as answers, the correct one is 19/40 since it is the answer reduced to the lowest terms.

Fraction Review also has a provision for maintaining a score card of the 10 highest scores. This makes it possible for a user to see his scores or for 10 students to play one round each and then see how each ranked in score at the end.

I asked my sixth grader, Monica, to try the program. Her class is now working with fractions. After she played a few rounds, I asked her what she thought. She replied, "Fine with me. I could use it. It is helpful and the screen is easy to read."

The SECA Fraction Review would be a good program for teachers to use. Individual students who are having problems with fraction addition and subtraction could use it and would have fun while doing so. Or, the class could be divided up into teams. The high scorer from each team could compete for the class championship, with a prize going to the team whose scorer ended up as the winner. Parents could use this at home to help their children make math study a little more enjoyable.

I have two minor complaints about this program. First, the author states the grade levels are 5 through 8. I think it would be more appropriate for grades 4 through 6. In our school district, students are introduced to fractions in the fourth grade; by the sixth grade, they are multiplying and dividing fractions. I cannot picture an eighth grader getting much use from the program. Second, a feature could be added to the score card so that, if a team is playing, a running total team score is also displayed. Otherwise, I highly recommend this piece of educational software.

(SECA, P.O. Box 3134, Gulfport, MS 39505; 601-832-8236, $24.98 plus $3 S/H)

— Mark S. Camp

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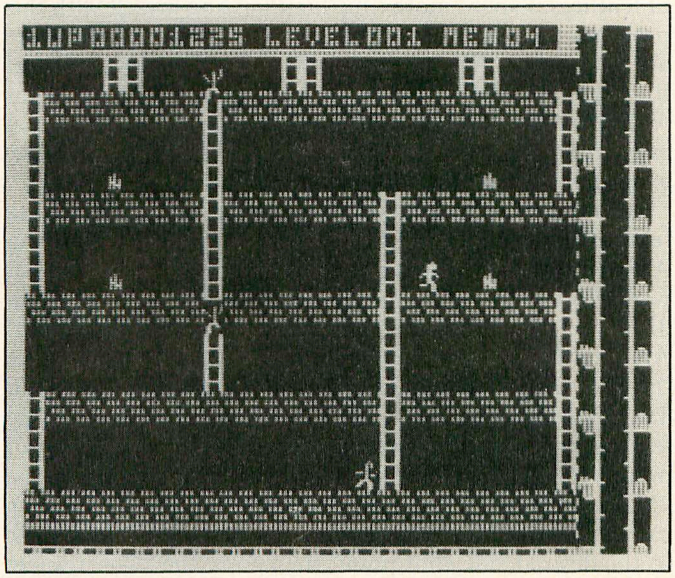
Gold Finder — A Game for Everyone

Do you have games that have umpteen screens but you can't get past the third one? Or games that have only three or four screens and go back to the first screen again? Would you like to design your own screens but are not a programmer? Do you have games you have memorized and can breeze though without losing a man and, thus, have lost interest? Well, *Gold Finder* from Tom Mix is a game for everyone.



For arcade game wizards who can get though the first round of game screens most of the time, try 70 preprogrammed levels plus 236 of your own design for a total of 306 levels to play. For those who are not so good, start at any level. If you can't make it past the third level, just edit the level to make it easier. (Don't do this on your original copy; do it only on a backup.) The only rule in creating a level is that you must have four enemies and yourself on the screen. Other than that, you are free to put dissolvable bricks, undissolvable bricks, ladders, ropes and gold on the screen in any order or pattern you like. ENTER saves the level to disk, CLEAR clears the screen, SHIFT-* edits the level selected in the options menu, and BREAK returns you to the title screen. At the title screen, pressing ENTER lets you view the high scores.

SHIFT-0 takes you to the options menu, where you select one or two players, what level to start on, which drive to load levels for each player, and which drive to save levels to. All drive selections default to Drive 0; all other options default to Drive 1.

Pressing the right joystick button starts the game at the level selected in the options menu. If you start from level one and score high enough, you can put three initials in the high score screen and it is written to disk. This game is a lot like *Gold Runner* from Tom Mix, with a few exceptions. You move faster than the enemies and, when you pick up a piece of gold, it is deposited on a conveyor belt at the bottom of the screen and moves to the left side of the screen. Here it is dropped into a bucket and slowly carried to the top of the screen. When you clear the sceen of all the gold pieces, you must wait until the last gold piece reaches the top of the screen before climbing one of the ladders or riding the elevator to the top. If you ride the elevator to the top without getting all the gold or don't wait for the gold to get to the top of the screen first, you will be killed. You can stay away from the enemies by outrunning them, dissolving dissolvable bricks and trapping them, or dropping through the hole to the next level. Caution: Dropping into a hole on the bottom level can be deadly — you can't climb out. If you drop into a hole, pressing R restarts the level but it will cost you one man.

Scoring is as follows: 250 points for picking up a piece of gold; 125 points when the gold is deposited at the top of the screen; and 1500 points for completing a level. You get one extra man each time you complete a level.

The game loaded fine the first time. The disk should be backed up since it is accessed each time you go to the next level. The instructions are printed on a single sheet but are very complete, with one minor exception. The instructions state that there are 69 levels on the game disk; mine had 70 levels.

Overall, I rate *Gold Finder* as one of the best games I have played. I like the fact that I can modify the levels for easier or harder play and that I can create my own screens.

The game does work on the CoCo 3 but uses artifact colors and is in black and white on an RGB monitor.

(Tom Mix Software, P.O. Box 201, Ada, MI 49301; 616-676-8172, Disk only, $27.95 plus $3 S/H)

— Mark Bullon

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Survey Programs for CoCo

By Stanley Townsend

When I got this old gray CoCo five years ago, one of my first attempts at programming was aimed at coming up with surveying programs. I'm a licensed land surveyor who occasionally brings work home, and I wanted something more powerful than my programmable calculator to help grind out coordinate geometry problems. As a newcomer to BASIC, I got no further than a rough, bare-bones traverse module before I realized how big the task before me was and set it aside. Since then I have watched the pages of RAINBOW and of surveying professional journals for ads about surveying programs for the CoCo. I ran across packages for other popular home computers, but for the CoCo, offerings have been as scarce as hen's teeth.

Survey Programs is on cassette for a 32K ECB CoCo. If you have a disk system, you'll have to unplug the controller. All graphics pages have to be cleared, and then this 28K plus program barely fits. The package allows the optional use of the TRS-80 TP-10 printer for hard copy. (I used it with my LP VII, and it seemed to work just fine.) Documentation consists of 28 loose 8½-by-11 pages and promises that after working through the included examples once, the instructions will no longer be needed. I agree: This program is so straightforward (a rarity in this field) I didn't need to refer to the instructions much, even the first time through. The documentation warned me about a high-speed poke (which my old gray beast won't take) in a certain line, but failed to warn me about the one in Line 1215. Once I found and deleted that one, things went smoothly.

Survey Programs stores up to 200 coordinate pairs (by point number) in high memory where they would be unaffected by a crash.

When using the module entitled "Field Traverse," bearings or field/deflection angles may be input. Angles are entered (for this and all other modules) in the usual DDD.MMSS format, with quadrants 1 through 4 for bearings. Distances input to this module may be corrected for slope or temperature. Side shots can also be input. There is an opportunity given to review data input and revise if necessary before calculation begins. After supplying the initial point number, subsequent point numbers are consecutively assigned automatically. It computes and stores latitudes and departures, which are not converted to coordinates until the traverse is balanced by compass or transit rule, at which time an area is calculated. Certain traverse legs may be held and omitted from the balancing procedure if desired.

A second traverse routine is available under the "Co-ordinate Geometry" module, accepting bearings and distances, and allowing user-assigned point numbers. This module also includes inverse, bearing-bearing, bearing-distance and distance-distance intersections, horizontal curve calculations, and coordinate transformation routines. Area computations are also available, including determination of the location of a sliding or pivoting line to enclose a specified area. Point numbers and coordinate pairs generated by this and the previous module can be saved to tape (with a specified file name), loaded from tape, or printed.

A third traverse routine is also available in the "Map Check" module. This one accepts bearings and distances, but no coordinate pairs are stored. Curved sides may be included by supplying chord bearing and distance, as well as radius. Balance by compass or transit rule is available, and area calculated.

The final module is entitled "Miscellaneous Calculations." Included here is an angle addition routine that sums positive or negative angles. The bearing calculation routine starts with a known bearing and converts a turned angle to the bearing of the subsequent course. A triangle solution routine is also available. Another routine converts the CoCo into a full-featured RPN scientific calculator.

As you can see, *Survey Programs* offers quite a number of features. I spent more time familiarizing myself with this program than with any other I've reviewed, and yet there are some areas I've barely touched. With the exception of the neglected high-speed poke, I encountered no problems with program operation. It is easy to learn and does most everything needed in the areas covered. I do, however, have a "wish list" regarding this program.

Although the automatic consecutive point numbering feature is handy, there are situations where it is limiting. Assume the user is going back to an existing traverse and wants to turn a field angle at point #103 and go a certain distance to establish the coordinates of a side shot point. Assume there is already a point #104 in the traverse. Since the field angle techniques are available only in the "Field Traverse" module, with its automatic point numbering feature, this operation would overwrite the coordinates of point #104. There is a way around this problem: Go to the "Miscellaneous Calculations" module and use the bearing calculation routine to determine the bearing of the course to the desired side shot point, then go to the "Co-ordinate Geometry" module (which allows user-assigned point numbers, but will not accept field angles) to establish the point. Unfortunately, this is a little inconvenient.

Curves can only be included in a traverse by traversing along the chord (or through the radius point). It would be nice to just supply the delta, radius, and direction of curvature and traverse straight to the E.C. Once again this is not an impossible situation: There are ways around it using intersect techniques, etc. It's just an inconvenience.

The hard copy obtained from the printer uses about a third of the page width at the left margin. Point numbers with bearings and distances are printed in a separate operation from point numbers with coordinates. While the printouts are logically arranged and readable, the format could be improved.

My main wish is that *Survey Programs* be made available for a disk system. I believe the average user in the market targeted by a program like this would either already have a disk system, or be willing to upgrade to one.

I hope I'm not coming across as too negative here: This is a fine piece of programming, and Mr. Jones is to be commended. I consider *Survey Programs* to be well worth the asking price and would recommend it to anyone wanting to use their CoCo in this field.

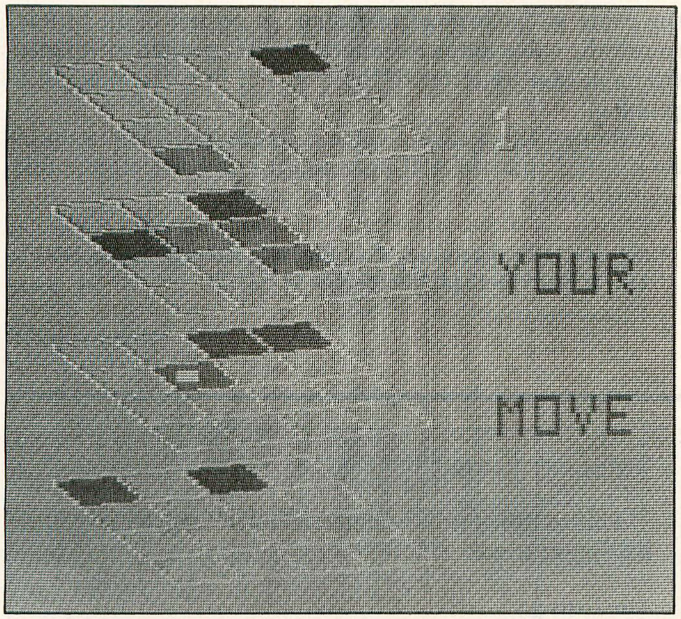
(T. P. Jones, 2338 Ryder St., Ottawa, Ontario, Canada K1H 6X6; $119 U.S., $159 CDN.)

Fourcube: A New Twist to an Old Game

I'm sure just about everybody has at one time or another played Tic Tac Toe. A lot of you have probably even played Reversi or some other variation of the "four-in-a-row" type game. Most were pretty simple and couldn't hold your attention for very long.

This latest version, *Fourcube* from Novasoft, will give you a lot more challenge for the money. Enough of a challenge to keep you interested long, long after those other games have been forgotten on the shelf.

You start with four cubes, one on top of the other. Each of those cubes has 16 squares within it. Your goal is to fill in four squares in a row. Sounds easy, but the computer is smarter than you think. You can accomplish your four in a row all within the same cube, or you can stagger them, one to a cube. Either way, you must think on four different levels at the same time to be able to outsmart the computer.



There are six levels of play. Level one offers little or no resistance to your obvious moves. This is great for youngsters. Level six kept me at bay for quite some time. The game also offers you a choice of joystick or keyboard operation. It also offers the chance to either play against the computer or another human opponent. It even plays itself in the Demo mode so you can see all the possibilities of how to win. I liked the "rotate" operation. Using the left and right arrow keys, you can rotate all four cubes to get a different view of the playing field.

Fourcube is witten completely in machine language so it's fast, fun and furious. I think you'll like this one.

(Novasoft, P.O. Box 201, Ada, MI 49301; 616-676-8172, tape $15.95; disk $18.95)

— Bill Bernico

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Extender Cable Offers Flexibility

One of the first things I noticed when I unpacked my new CM-8 monitor was that the video cable that attaches to the CoCo 3 was only about 3 feet long. That's long enough if you plan to set your monitor right behind the CoCo 3 or on a stand or shelf just above it, but it's too short if you need to move it farther away. Enter the Spectrum CM-8 6-foot Extender Cable.

This 6-foot cable from Spectrum Projects will allow you to move your CM-8 to most any place you like. I found this to be a big help for me because the large 13 inch CM-8 screen is too close for me and results in added eyestrain. Using the extender cable, I was able to move the monitor farther away, and now I don't have to wear my glasses while computing!

The flat-ribbon cable is well-made, with a male connector on one end and a female connector on the other end. Since the cable is flat instead of round, as on the CM-8, I had to roll the cable along its length to get it pushed down into the cable slot underneath the CoCo 3. But that was not a problem.

Although I feel such a cable is handy for CM-8 users, I do not feel that the $20 price tag for an unshielded cable is reasonable.

(Spectrum Projects, Inc., P.O. Box 264, Howard Beach, NY 11414; 718-835-1344, $19.95 plus $3 S/H.)

— David Gerald

Two-Liner Contest Winner . . .

This routine prints a chart for you to list your favorite BBS numbers.

The listing:

```
10 PRINT#-2,CHR$(27)"W":PRINT#-2
,TAB(14)"BBS ID NUMBERS":PRINT#-
2,STRING$(40,"="):PRINT#-2:PRINT
#-2,TAB(0)"BBS NAME"TAB(14)"area
 PHONE No."TAB(30)"ID NUMBER":PR
INT#-2
20 FORX=1TO25:PRINT#-2,TAB(0)"..
........."TAB(13)"(    ) ...-....
"TAB(30)"..........":PRINT#-2:NE
XT X
```

J.A. Carey
Brooklyn, NY

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

It's a Bird; It's a Plane; It's *Champion*

Stronger than a locomotive (not quite); able to leap tall buildings (maybe just fly around for a while); the *Champion* is here to save the city of Oakdale. *Champion*, a program from Mark Data Products, is an Adventure game written for a Color Computer with 64K and at least one disk drive. It comes with six pages of instructions, a disk and vinyl portfolio. This is more than sufficient to play the game.

The Champion is a crusader endowed with special powers. He has taken it upon himself to rid the world of crime. However, his arch rival, Mr. Bigg, does not quite see it that way. Mr. Bigg, a criminal mastermind, plans to use his great powers to rule mankind. Using his influence, he has gathered a great army of villains and plans to take over the city of Oakdale. Mr. Bigg can take on any form and can easily hide among his army of villains.

A government group, The Service, has developed a device that can detect Mr. Bigg. The only problem is that it has been stolen by a spy, disassembled into three parts, and been hidden somewhere in Oakdale. Meanwhile, your sources have discovered that Mr. Bigg has a gadget called a power drain, which he intends to use on you. It is also hidden somewhere in the city. If you can recover the gadget first, you may be able to destroy Mr. Bigg with his own weapon. At this point, the challenge begins.

The game could be considered a variation of the classic Star Trek type game. The city is divided into sectors specified by a horizontal and vertical coordinate. This is displayed in the upper-left corner of the screen along with a small description of the location. The bottom-left is the command area where you use the joystick to control the activities of the Champion. The upper-right contains a section of the city map while the lower-right displays responses to your queries and displays actual combat sequences.

Champion consists of two modes: flight and grounded. During flight, the Champion can fly above the city and is not restricted to following the roads because the villains are active and moving around, and the game clock is running. The difficulty level you choose to start the game determines the length of time before the villains attack the sectors. When the message `Villains on the Move` is displayed, the city is being attacked. The villains are only interested in attacking the city and not the Champion. When in flight, you have access to your on-board computer, which can identify sectors containing villains but cannot identify the particular villains until you are grounded.

Once grounded, you may attempt to search a sector for the missing detector pieces or the power drain; however, if there are villains present, you are not allowed to search the sector until they are destroyed. Here lies the real challenge. The Champion has strength and endurance. The strength is a finite amount and cannot be replenished, while endurance may be increased by hovering in flight. Once the strength is gone, the Champion dies and the game is over. Your strength is decreased by the amount of damage you sustain during attacks to rid a sector of its villains. While grounded, your on-board computer can provide a status of your current sector (taken or free), a list of what you have already recovered, and a complete map of the city. You can also attack a villain or return to flight.

> ***"If you can recover the gadget first, you may be able to destroy Mr. Bigg with his own weapon."***

There are actually four types of villains that you must contend with: agents, villains, raiders and Mr. Bigg. The agents are the weakest; Mr. Bigg is the strongest. Likewise, the agents are the easiest to kill and can cause the least damage to you, while raiders are the toughest and can really do some damage if they get hold of you. Naturally, it requires the power drain, to eliminate Mr. Bigg. Without the power drain your only weapons are the blast, punch, kick and dodge (you must move or you may also be blasted, punched or kicked). The blast uses the most endurance and the most time, while the punch uses the least. The dodge also uses some endurance. Sometimes you may have to hit and run. You must remember that villains increase their endurance while you are in flight. Choosing the retreat function costs you 100 points.

Every time the message `Villains on the Move` appears, the sectors are being attacked by Mr. Bigg's army. A sector begins with 15 strength points that decrease each time it is attacked. The number of points decreased is determined by the number and type of villains in the sector. An agent costs one point, a villain costs two, a raider costs three, and Mr. Bigg costs four. When the sector strength points reach zero that sector is "taken." When all sectors have been taken by the villains, the game ends, just as it does when your strength runs out.

This is a fascinating game and a very difficult one to master. It takes a while just to be able to move the joystick quickly enough to outmaneuver the villains during an attack. Anyone enjoying the *Star Trek* type action games will get a blast (no pun intended) out of this one. Oakdale needs your help! Be a crusader. Be a true *Champion*.

(Mark Data Products, 24001 Alicia Pkwy. #207, Mission Viejo, CA 92691; 714-768-1551, $27.95)

— Larry Birkenfeld

Datapack II Plus (and *III+*) — Super Smart Terminals

As terminal programs add capabilities, they often add such complexity that users are intimidated by the many available commands.

The challenge for the software programmer is to provide the features and power of a smart terminal program with the simplicity of a ROM pack.

One successful terminal program combining power and ease is *Datapack II Plus* Version 4.0 from Cer-Comp. As the name implies, *Datapack II Plus* is a full-featured terminal/data communications program. It is the most fully featured communications program I have ever seen for the Color Computer.

Datapack II Plus is an M6809 machine language program written for the Color Computer. Actually, eight versions of *DPII+* are included on the disk. There are versions that support the Double Density and PBJ 80-column video boards as well as the Disto Super Controller with the 80-column card. Also included are versions to support either the standard RS-232 port or the deluxe RS-232 cartridge.

DPII+ senses the maximum available memory in the computer and adjusts the buffer to take advantage of this storage capability.

Even if you don't have an 80-column adapter, *DPII+* has a high resolution command that sets the number of characters displayed per line on the high resolution screen. This can be varied from 28 to 255 characters. All screen widths above 64 characters per line are unreadable, but can be useful for seeing print formats on the display before printing a document.

The list of *DPII+* commands is extensive. However, the default settings of the program are the most commonly used. These options give you the flexibility to customize the program to meet your needs.

A very useful tool has been included with *DPII+* to assist the user in getting maximum application from the program. A communications programming language called Auto Log enables the user to have *DPII+* automatically connect with a desired information source and position the requested terminal settings.

Auto Log files can be saved either to disk or tape and used any time you are in the terminal mode. All the functions and commands of *DPII+* can be used in an autolog file. You can use them for uploading, downloading, logging off a system or whatever you like; it depends on your imagination. Auto Log gives you the power of *DPII+* in an easy-to-use operating shell.

DPII+ also gives you the capability of emulating a VT 100 terminal. While this will be of limited interest to most CoCo users, if their company's mainframe is a Digital VAX, and their employer has sufficient foresight to allow employees to log onto the computer from a remote terminal, this feature will be appreciated. The PF-X commands used in the VAX MASS-11 word processing program are a pain on the Color Computer's keyboard, requiring holding three keys simultaneously. Considering the differences in the number of keys between a CoCo and VT100, it's amazing the Color Computer has any emulation capability.

Overall, I found *Datapack II Plus* an excellent communications program. Its capabilities are unexcelled, and this power is usable as logical command codes are used to control these features. A 50-plus page user's manual is included. This manual will walk a new user through the program's features. Auto Log files, once set-up, allow the user to rapidly log onto information sources and discover what awaits them on the other side of the phone line.

— Bruce Rothermel

A Look at *Datapack III+*

As smart terminals, both versions of *Datapack* are essentially the same. While *Datapack II Plus* requires the use of add-on cards (PBJ or Disto 80-column card, RS-232 pack and multipack) to fulfill its full potential, *Datapack III+* takes advantage of the new features found on the CoCo 3 to achieve the same performance with far less clutter. While support of 80-column cards has been discontinued with the new *III+*, full support for the CoCo 3 is provided. All palette options are available for a customized RGB display. Screen widths from 32 to 80 columns are supported, as well as a monochrome display option.

A general rundown of the program configuration reveals that it supports xon/xoff, with user-definable download characters. A control character trap and filter are also provided and, again, are user definable. Xmodem upload and download are fully supported with a status display of the Xmodem process as it is implemented. All communication parameters may be easily set, or programmed into a custom `AUTOEXEC` file that will automatically configure the program with up to 12 different parameters, such as terminal and printer baud rates, data bits, etc. A general status screen is the default display in the command mode. This screen displays all of the current terminal settings, as well as the memory status of the PK and terminal buffers. What's a PK buffer?

Most smart terminal programs allow the use of several user-definable keys to send short strings, usually as an adjunct to the log-on procedure. *Datapack* provides for nine such keys, but there is a major difference in the way these buffers may be utilized. Each programmable key (PK) may contain any amount of information up to the total amount of memory available, i.e., one key may be programmed to contain up to 49K of information! A PK buffer may be

POLICE OFFICERS and others

If you are involved in the reconstruction of motor vehicle accidents or would like to learn, this program is a must. The program is extremely user friendly. It allows you to enter just your road measurements. The computer will give you the speed of each vehicle at the point of impact. Answers output to screen or printer. Complete instructions for the beginner. This program is written for a 64K COCO ECB disc. It is easily adaptable to other RADIO SHACK computers. Order **RECON** today.

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printed, saved to disk, contain a *Datapack* command string, or be transmitted to a host computer. The PK buffers may be programmed to issue commands within *Datapack* and stored on disk. When recalled, either by the program (`AUTOEXEC`), or the user, an automated terminal configuration and log on (`AUTOPILOT`) is quickly and accurately accomplished.

Datapack is configured with an adequate text editor. Full line edit capabilities are provided, along with a 10 line jump command. However, the lack of buffer navigation aids, such as mark, find or search, limit the program in manipulating large blocks of text. As *Datapack* handles standard ASCII files, such operations may be performed offline with any compatible word processor.

While a complete memory status update is always available, it is not displayed or windowed in the terminal mode. As such, a buffer overflow is possible. Online, *Datapack* will retain the most current information, up to 49K. When the buffer is full, wrap-around occurs on a first-in, first-out basis.

Xmodem implementation is extremely smooth, supporting direct to disk send and receive operations. Options are provided for both binary and ASCII formats, with a complete onscreen display of the Xmodem file transfer status.

While there have been several reports that *Datapack II Plus* will sometimes drop characters right after a carriage return, if a fast typist is using it (and more likely in Hi-Res mode), the *III+* program has an improved keyboard handler that should make this serious problem unlikely to occur.

While it was not tested, *Datapack III+* is said to run at 2400 baud through the bit banger port! Certainly, that is a singular accomplishment in good programming and a very desirable feature.

Datapack is heavily and cleverly copy-protected. As a purchaser, you will have to rely on Cer-Comp for backup support, as the distribution disk may not be backed up or cloned by any conventional procedure. The original disk may be "refreshed" with a modified, non-functional backup, but no other user maintenance is possible. *Datapack* is supplied as a doubled-sided disk with a complete copy of the program on each side. Minimum system requirements are 32K with at least one disk drive.

Once *Datapack* is configured and running, it is an extremely user-friendly package. The documentation is excellent, providing a full description of each command as well as sample `AUTOEXEC`, `AUTOLOG` and `AUTOPILOT` sequences. One rather useful utility has been omitted from the current manual. *Datapack* looks for a file of the type `AUTOEXEC.DAT` in Drive 0 when the program is first booted. With a two-drive system, the distribution disk may be installed in Drive 1, with a short BASIC loader and a custom `AUTOEXEC` file stored in Drive 0. The files in Drive 0 may then be used to boot customized versions of *Datapack* for each BBS or information service that the user employs.

The error trapping within *Datapack* is superb. There is an onscreen menu of all available commands, along with prompts as to the type of information each command requires. If an incorrect command is issued, the user is so notified, and prompted for another value. The only "fatal" error that may occur is with the reset switch which is not disabled and will reset your machine, resulting in the loss of any data currently in the terminal buffer.

VT52/100 emulation is one feature that is unique to *Datapack*. To be sure, it is not required on any system that is currently running, but it is almost universally supported by all the major information networks. With an 80-column screen, VT-100 emulation provides for a very pleasing screen refresh. Additionally, many services support online screen editing via VT52/100 control codes. As the VT52/100 protocol is extremely long, complete implementation is impossible with the CoCo. *Datapack* supports auxiliary keypad sequences, 0-9, as well as PF 1-4. Status and cursor position reports, control codes to enable/disable line feed-new line, cursor key modes and ANSI/VT52 are also supported. All other DEC VT set/reset modes are ignored.

With the use of VT-100 emulation, many private mainframe systems may be contacted. While this later capability is almost exclusively the province of private industry, it is an extremely attractive option for those who can take advantage of such a capability. The documentation provided with *Datapack* assumes that the user is familiar with the DEC VT protocol. If this is not the case, a copy of the DEC VT52/100 manual will provide a useful, perhaps necessary, adjunct to this diverse capability.

If your interest in telecommunications is in the area of data retrieval, forum communications, or program downloading, it will be quite difficult to find any program that out-performs *Datapack*. While I have pointed out some flaws, I haven't used any CoCo terminal program that comes close to the overall performance of *Datapack*.

(Cer-Comp, 5566 Ricochet Ave., Las Vegas, NV 89110; 702-452-0632, $59.95)

— Henry H. Holzgrefe

ADOS ENHANCED, EPROM-ABLE DISK BASIC

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THE RAINBOW, December 1984
"I LOVE ADOS! . . . A GENUINELY FIRST RATE PRODUCT."
Color Micro Journal, February 1985
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Hot CoCo, May 1985

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Disk . . . $23.95 **Assembler source listing . . . Add 3.00**

NEW FOR COCO3

CUSTOM CABLE FOR MAGNAVOX RGB MONITORS

The Magnavox 8CM515 and 8CM505 monitors, containing RGBA, RGBI, and audio inputs, sell at prices comparable to Tandy's CM-8, and represent a far better buy for CoCo 3 users. Composite input, which CM-8 lacks, is required for seeing PMODE 4 displays in color. RGBI allows the Magnavox, unlike the CM-8, to be used with PC-Compatibles — a big resale consideration.

. . . Cable 19.95

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Disto Super RAM 3: Quick and Simple

The Disto 512K upgrade is the smallest I've seen so far. The double-sided glass epoxy circuit board measures 2¾ by 2⅞ inches and contains 16 socketed NEC 41256 120 ns DRAMS. Two rows of header pins extend from the bottom of the board and plug in to matching sockets on the CoCo 3 board.

Installation instructions supplied with the board consist of five steps. After taking appropriate grounding precautions, the four 128K RAM chips IC16, IC17, IC18 and IC19 are removed. Two small capacitors, C65 and C66, are clipped with small wire cutters and removed. The new board is then plugged into the two white header sockets on the CoCo 3 board. That's all there is to it. In 20 minutes or so, you will have completed the job.

> ***"In 20 minutes or so, you will have completed the job."***

This upgrade has the memory chips facing up to facilitate better ventilation. It also does not use a ground plane. In RFI (Radio Frequency Interference) comparisons on my short wave equipment, I could not hear any interference. An interesting addition to the Disto upgrade is the use of a thin sheet of anti-static foam on the underside of the board. This prevents any accidental electrical contact between the bottom connections and components on the CoCo 3 board.

Also included with the Disto upgrade is a disk that contains two very useful programs. The disk is not copy-protected so backup copies for your own use and protection are advisable. A 512K memory test program is useful to check out your new board and a utility to create 1 or 2 RAM disks and a printer spooler is also provided. The spooler has a handy feature if you have Disto PPRINT capability. With this feature, you can use the parallel printer port with the Disto printer adapter. Installing the RAM disk and spooler utilities is easy to do, and a one-page instruction sheet is provided.

Disto Super RAM 3 offers a great bargain and will provide some excellent uses for your CoCo 3's expanded memory capability.

(C.R.C. Computers Inc., 10802 Lajeunesse, Montreal, Quebec, Canada H3L 2E8; 514-383-5293, price available on request. The software is also available from Spectrum Projects, P.O. Box 264, Howard Beach, NY 11414; 718-835-1344, for $24.95 plus $3 S/H)

— Jerry Semones

History Comes to Life With Educational Software

How would you like to travel across the Atlantic Ocean with Christopher Columbus in search of a new passage to India? Or look for the Fountain of Youth with Ponce de Leon? How about a trip to the moon with Neil Armstrong?

You can experience these and many other events from the history of our country with software available from Compass Education. The American History package contains the history of the United States from the time of its discovery by Christopher Columbus to the day Neil Armstrong landed on the moon.

Lesson plans one through eight deal with the discovery of America, the Colonial period, the American Revolution, the Constitution and the War Between the States. Lesson plans nine through 16 deal with settling the West, World War I, World War II and how we reached the moon.

Each lesson is presented in an audiovisual manner. This is an excellent way to learn; while you are seeing the material presented on the screen, you are hearing about it.

These programs are in a logical and well-presented format. At the end of each lesson, a scoreboard shows the number of questions asked, the number answered right on the first try and the number of wrong answers.

This is the final study course in the educational software package I've been reviewing for the past five months. All five have met my criteria for valuable educational software: They're user-friendly, provide varying levels of difficulty, and include review capability and positive reinforcement. All the programs have been entertaining and educational. I would not hesitate to recommend them.

(York 10 Software, 9525 Vassar Avenue, Chatsworth, CA 91311; 818-700-0330. Two-volume set $49.95 plus $3 S/H)

— John H. Appel

Two-Liner Contest Winner . . .

This subroutine shows you how to prevent a lockup because your printer wasn't online or turned on.

The listing:

```
10 CLS:A=PEEK(65314):B=INT(A/2):
C=A/2:IFC-B=0THENPRINT"PRINTER O
N"ELSEPRINT"PRINTER OFF"
20 IFC-B=0THENPRINT#-2,"THIS CAN
 BE A PROGRAM PRINT STATEMENT."E
LSEPRINT"TURN PRINTER ON"
```

Jim Knoppow
Kent, WA

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

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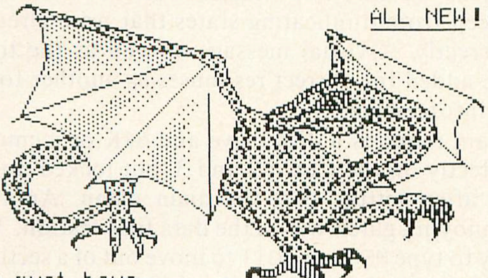

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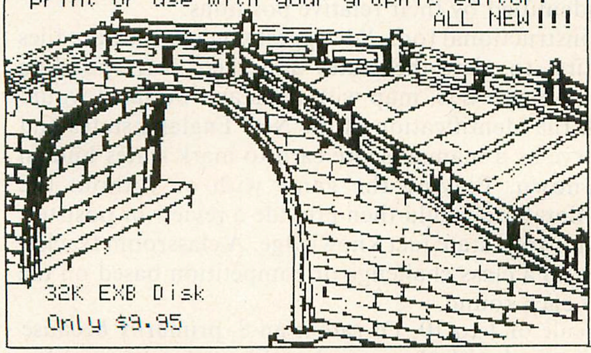

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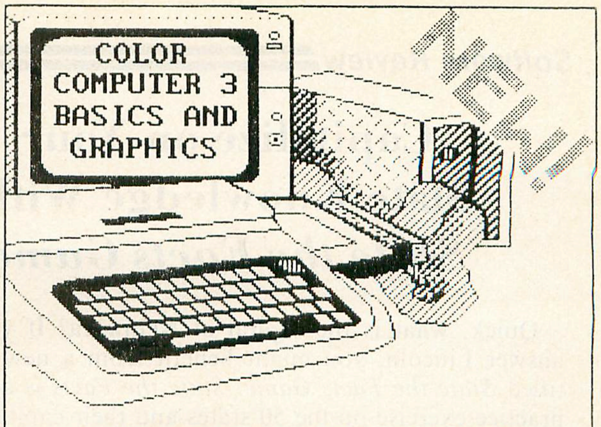

A GUIDE TO COCO 3 BASIC AND GRAPHICS

Do you want to learn more about your Color Computer 3? If so, A Guide to Coco 3 Basic and Graphics is what you need!

This practical guide to the Coco 3 is written by Linda Nielsen, a long time Coco user. It has more than 50 pages of examples, explanations, and programs especially for the Coco 3.

Not only that, the Guide includes a disk of programs and pictures. Translate low res graphics onto the high resolution screen. Draw on the 320 by 192, 16 color or the 640 by 192, 4 color screens. Learn how to display 256 artifacted colors on a television or composite monitor.

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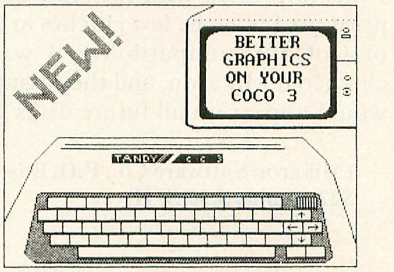

Use the graphic power of your Coco 3! More good information and examples of high res graphics on the Coco 3. Create better static illustrations. Learn more about Basic animation, screen scrolling, tips on HPUT and HGET, how to use HDRAW and much more. Better Graphics on your Coco 3 plus two disks of programs and pictures. $24.95.

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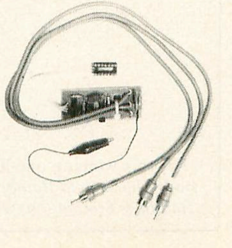
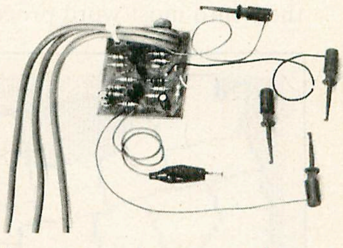


DOUBLE DRIVER II



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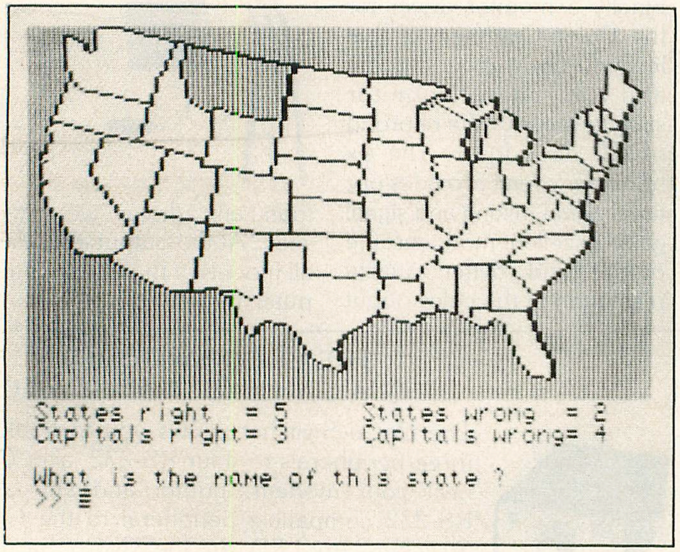
Software Review

Capitalize on Your State Knowledge With *State the Facts Game*

Quick, what is the capital of Nebraska? If you didn't answer Lincoln, you might benefit from a new program titled *State the Facts Game*. *State the Facts* is a drill and practice exercise on the 50 states and their capitals. A Hi-Res map of the United States is drawn on the screen. Next, states are picked at random and highlighted on the map for the player to identify. The player gets three chances to identify the state and then is asked to identify its capital.

There are three game options available: 1) Identifying states and capitals with optional state data, 2) Identifying states and capitals without the state data, and 3) Viewing the state data files only. The feature that sets this state identification program apart from others is the optional database. When choosing this feature, you can get further information about the state's geography, history, population, etc. This makes it a more valuable learning tool, because the user can browse through individual state information in addition to doing memory practice on states and capitals. The files are written in ASCII on the disk. Data in these files could easily be added to or modified by loading them into most word processors and then resaving them.



```
States right   = 5      States wrong   = 2
Capitals right= 3       Capitals wrong= 4

What is the name of this state ?
>> ≡
```

The program keeps a running total of correct and incorrect responses on both identification of states and capitals. High and low pitched tones signal the correct and incorrect answers, respectively. Spelling is important for the responses, since incorrect spelling counts as a wrong answer. In general, all words should be spelled out, rather than abbreviated (West Virginia instead of W. Virginia).

Documentation consists of one small sheet of paper that includes loading instructions and general information about the program. However, I don't consider this to be a drawback. The majority of the needed instructions are located on the main menu screen. Actually, programs with straightforward directions should include them within the program for the user's convenience.

There were two features missing that would make *State the Facts Game* more effective. The program, because of its random picks, does not repeat missed states or make an attempt to keep from duplicating states that were already answered correctly. A visual message as well as the tone could also be added for correct responses as another form of positive reinforcement.

The program requires a disk drive and 64K of memory. It works perfectly on the CoCo 2 and 3, but locked up on the CoCo 1 after getting past the main menu. Another somewhat annoying glitch was in the data files section. The directions say to type `MENU` or `QUIT` to move out of a section, but this didn't work. I found out by accident that if you choose state 51, it returns to the main menu. This is not clearly documented in the program. The Hi-Res map is generally good, but the New England states are cramped. Some of them are hard to distinguish by shape and could only be identified by their relative positions.

As an instructional tool, I'd suggest you use the data files section first to view the states and their corresponding capitals. A blank U.S. map with the states outlined would help with the identification of the New England states and would serve as a manual score card to mark states known and unknown. Playing the game with or without the optional database would then provide a review or post-test to check on your state fact knowledge. A classroom teacher might set up a class challenge or competition based on the results of each round.

On a scale of 1 to 10, I'd rate it an 8, primarily because I was impressed with the state data file and its reasonable price. As far as the few glitches in the program and the issue of CoCo 1 compatibility, I was a bit disappointed. I contacted Mikaron, and they assured me that fixes for these would appear on all future disks shipped.

(Mikaron Software Co., P.O. Box 1064, Chester, CA 96020; $22.95 plus $.50 S/H)

— Mark Haverstock

One-Liner Contest Winner . . .

Use this program to print any information on standard 3½-inch by 1-inch labels.

The listing:

```
0 CLS:PRINT"SET LABELS":L=96:FOR
I=0TO5:PRINT@L+40,"<":PRINT@L,""
;:LINEINPUTA$(I):L=L+64:IFA$(I)<
>""ANDI<4THENNEXTELSEINPUT"OK";A
$:PRINT#-2,CHR$((I<3)*-10);:FORK
=1TO999:FORJ=0TO5:PRINT#-2,STRIN
G$((28-LEN(A$(J)))/2,32)A$(J):NE
XT:INPUT"AGAIN";A$:NEXT
```

Jim McDowell
Burlington, VT

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

Sigmaword: Instructive Word Processor for Beginners

Every CoCo beginner soon starts to search for a word processing program. Why not start with a simple, inexpensive one? After using it for awhile, it will be easier to know just what your requirements are for a word processor. *Sigmaword* is a good starter program that will permit you to refine your requirements. You can learn a lot about word processing from *Sigmaword.*

When the program is entered, questions are asked with reference to presentation on the monitor screen. You may select black letters on a white background or white letters on a black background. I prefer black letters on a white background, but the choice is there for you to make.

After the background and letter color choices are made and entered, a word-counting bar is printed across the bottom of the monitor. Because of the details one must keep in mind to preserve the accuracy of the word-count system, I did not find this feature useful. But, it is not in the way and is easy to ignore.

The main menu, only accessible from the Command mode (the program automatically opens in Command mode), is reached by pressing the BREAK key. This menu includes New file, Display/edit/add, Display with justification, Print, Directory, Save file, Load file, and Setup. Free memory on disk is also printed.

After the program has been entered and the color of printing and background selected, the program is automatically in the Command mode, ready for you to enter whatever you want from the keyboard. This is the same as if you had called for the main menu and selected either New file (N) or Display/edit/add (D).

If you select "D" and the Edit mode, the up and down arrows permit moving the cursor to the point where you want to insert, delete or make changes. Although the Edit function works, I found it to be awkward and time-consuming.

In the Edit mode the cursor may be moved, using arrows, to the point in the document where corrections, deletions or additions are to be made. To insert, the "I" is pressed, and the material to be inserted is typed in, or deletions made. If the position of these changes is made in more than a few lines from the end of the document, the process of making the changes and getting back to the place in the document from which you entered the Edit mode is so time-consuming that you may decide that it is better to erase and start all over again. There are no provisions for block or word copy or move, headers or footers, page numbering, global or any other search, setting of tabs and many other things found in more expensive programs.

> ***"You can learn a lot about word processing from* Sigmaword."**

When in Command mode, the down arrow becomes a REPEAT key. Since the left arrow erases whatever is immediately to its left, the combination of down arrow and left arrow permits rapid erasing. The main menu can only be reached from Command mode.

The Print facility provides underlining, font changes, and anything else for which you can find a `CHR$` code. This is done by entering the proper `CHR$` code (preceded by right arrow and followed by another right arrow).

The instructions accompanying this program are not the highest order and should be rewritten. They can be followed, but it isn't easy! This program does work, and the price is low. Try it, you may like it! It is certain that you will learn from it. For an error-free typist who has no requirement to do much editing, *Sigmaword* would be an adequate word processing program.

(Sigma Software, 14025 152nd Ave. S.E., Renton, WA 98056; $9.95)

— Charles L. Redman, Jr.

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OS-9 Level II: Versatility, Power and Low Price

By Dale L. Puckett

We'll start our review of OS-9 Level II by highlighting some of the differences between this package and Level I. To find the differences, I set up a pipeline using a single-line public domain directory listing utility and a third-party sort program to put OS-9's multitasking to work. Why should I work to find the differences when I have a powerful operating system at my finger tips? The command line looked like this:

```
OS9: ls /d0/cmds ! qsort >/p
```

When OS-9 finished running this command, I had a hard copy of all the utility commands available on the OS-9 Level II system disk. The names of the utilities were listed in alphabetical order, with one name on each line. Next, I issued the same command on the OS-9 Level I, Version 2.00.00 system disk. I then taped the two listings side by side and noted the differences.

When I compared the two printed listings, I noticed that `asm`, `binex`, `debug`, `dump`, `exbin`, `grfo`, `login`, `printerr`, `save`, `sleep`, `tee`, `tsmon` and `verify` were missing from the Level II system disk.

At the same time, I noticed that the `CMDS` directory on the new Level II system disk contained `deiniz`, `error`, `grfdrv`, `modpatch`, `montype` and `wcreate`. By comparing the two lists, we can learn a lot about the design and marketing philosophy of OS-9 Level II. Don't fret; it's good news!

Most of the utilities missing from the list are those used by assembly language programmers. Tandy wisely decided that the average Color Computer owner starting to use OS-9 is probably not an assembly language programmer. They pulled the assembler and debugger out of the OS-9 Level II release and made a very smart substitute. When you buy OS-9, you now receive BASIC09 with the package — a good move, since most Color Computer owners are familiar with BASIC programming.

This philosophical change also means the `DEFS` directory is not needed on the Level II system disk. Assembly language programmers will receive the files in the `DEFS` directory when they purchase the new developers pack. This addition to the OS-9 product line will include a screen editor and a relocatable macro assembler, as well as a number of additional device drivers and descriptors.

Because of OS-9's versatility, beginners can set up their system disks to run BASIC09 immediately after they start up their Color Computer. This places them in a familiar environment and should remove much of the panic that overwhelms many OS-9 newcomers.

To set up your system disk, move a copy of BASIC09 and `RunB` to the `CMDS` directory on your system disk. Rename the copy of BASIC09. Call it `AutoEx`. Now restart your computer and watch what happens. Don't blink or you won't notice what happened. As soon as OS-9 finishes running the last command in your start-up procedure file, it runs `AutoEx` and you will see the familiar BASIC09 billboard. Of course, if you want to go to work with your text editor, you could change the names `TsEdit`, `DynaStar` or `Stylograph` . . . to `AutoEx`. A fantastic idea!

`GFX2`, the high resolution graphics package that comes with BASIC09, will literally knock your socks off. With it, you will be able to write object-oriented drawing programs that spit out graphics quality that no bit map-based program can touch.

With high level BASIC09 run commands, you can select from 64 colors available in four 16 color palettes. You can set the border color and create colored patterns and new cursors. You can use logic functions to mix colors and use automatic scaling to draw outlines or filled boxes. You can draw ellipses and arcs and fill your objects with the color of your choice. You can get and put sections of your graphics screen to create animation effects, and select your own font. Letters can be boldface, proportionally spaced, transparent or underlined.

`Grfdrv` has the same function, albeit many times the power, as `grfo`, so there is little change. Because of the basic design of Level II, a `printerr` utility is not available on any Level II system. However, one third-party software developer sells one. Tandy's version of Level II solves this problem by giving you the ability to receive an English language error message by typing the command `error` followed by the error number in question.

The missing `login` and `tsmon` utilities may be a serious problem for a few users. Again, I'm sure the fact they are missing revolves around the Color Computer OS-9 design philosophy. "With the rich windowing environment, why would anyone want to use an external terminal?" That's a very valid question, and it says a lot. Besides, the addition of an immortal shell concept to the package accomplishes the same thing — almost.

On the other hand, the addition of the `modpatch` utility can only be heralded as a terrific idea. It's an excellent tool that would have been nice to have a long time ago. You use it to patch and correct the CRC of a module in memory. After you run it, you can use the `cobbler` utility to put the changes in your `OS9Boot` file.

Another slick addition is a new device descriptor named `/dd` — for default device. Tandy utilities that have a unique pathlist hard-coded use this device. For example, the `error` utility reads its English language error messages from `/dd/sys/errmsg`.

The `/dd` device descriptor is nothing more than a copy of the device descriptor you want to use as your default device — with its name changed. For example, if you routinely copy `SYS` directory files into a RAM disk named `/r0` when you boot your system, you may want this RAM disk to be your default device. To make `/r0` the default device, you need only make an extra copy of the module named `r0` and change its name to `dd` using `modpatch` or another verifying patch utility. People who own hard disk drives will want to make a copy of their `/h0` device descriptor and rename it to `/dd`.

This addition means programmers who must hard-code a pathlist into a program can standardize on the device name `/dd` as their default. If this is done, everyone will be able to run their programs, without worrying about using the same device name as the programmer. Another step toward ease of use has been made through this standardization.

Another welcome addition to OS-9 Level II is an online `help` utility. If you forget how to run a particular utility command, you can simply type `help` followed by the name of the command to receive a detailed message. This message describes the proper syntax for the command. The utility lists its messages from a text file with a pathlist of `/dd/sys/helpmsg`.

When you boot OS-9 Level II and use the `mdir` command to take a look at the modules in memory the first time, you'll notice that the following frequently used OS-9 utility commands are always in memory: `copy`, `date`, `deiniz`, `del`, `dir`, `display`, `echo`, `iniz`, `link`, `list`, `load`, `mdir`, `merge`, `mfree`, `procs`, `rename`, `setime`, `tmode` and `unlink`.

Having these commands available instantly, with no disk access required, is very convenient. It saves a lot of time and is also very memory-efficient. The `shell` command, which must always be resident, and all of these utility commands fit in one 8K block of memory. The Color Computer's GIME chip switches memory in 8K blocks. Since the `shell` command has to be in memory all the time, Tandy's designers decided to use the remainder of the 8K block used by the `shell` — a very smart move indeed!

There are few things, if any, you could do with Level I that you can't do with OS-9 Level II. The use of an external terminal is one of the only question marks because `tsmon` and `login` are missing from the Level II release. But, I'm pretty sure you can use another terminal by simply running a shell and redirecting the input, output and error output paths to `/T2`. Yep — it works! I typed:

```
OS9: iniz /t2
OS9: shell <>>>/t2&
```

The device `/T2` was set at its default value of 9600 baud. I hooked up a cable to my Macintosh and called up Red Ryder. At 9600 baud, no parity and one stop bit, the directory and file listings from the Color Computer hard disk flew by on the black and white Mac screen. The only thing missing is the ability to use `tsmon` to `login` as another user from another terminal. I'll work on that.

When you move up from Level I to Level II, the number of options available is increased. For example, with this version of OS-9, if you own a double-sided drive or an 80-track drive, you can use it without buying additional third-party software drivers. You run the `config` utility to create a new `OS9Boot` file, using the device descriptor modules supplied in the `MODULES` directory on the Config disk that comes with Level II. Unfortunately, device descriptors set to a stepping rate of six milliseconds are not supplied. However, since the descriptors follow the OS-9 standard, you can patch them with `modpatch` as we reported in the April issue of "KISSable OS-9."

When you stop and think, you quickly realize why Tandy left the `tsmon` and `login` utilities out of this package. With all those windows and the new immortal shell feature, why would you ever need another terminal? I can't think of too many reasons.

The OS-9 Level II release disk comes with no less than eight window device descriptors in memory. All you need to use them is run the `iniz` utility and start up a shell in the new window. If you are running with 512K in your Color Computer 3, you can open all eight at one time and run different processes in each. With a 128K machine, you are pretty limited and things will get tight rather quickly. You can only open one or two windows on one screen if you want to save enough memory to run a process or two.

With the new Color Computer and OS-9 Level II, you can have it your way. You can create standard windows and overlay windows. If you use overlay windows, you can save the text or graphics image under the overlay, and the system will redraw it when you close the overlay window. You can pick the foreground color, the background color and the border color when you create a window. If you change your mind or get bored easily, you can change these colors on the fly, by typing short display commands. You can also discard windows after you are finished with them to free their memory for other processes.

"With all those windows and the new immortal shell feature, why would you ever need another terminal?"

Level II designers had your sanity in mind, too! While you can create a window by typing hexadecimal parameters following the `display` utility command, they added a tool named `wcreate` that lets you create a window by typing a series of decimal numbers. Which would you rather type?

```
OS9: display 1b 20 5 0 0 50 18 2 4 1
OS9: wcreate /w7 -s=2 0 0 80 24 2 4 1
```

Both of these command lines create a red screen with black letters and a blue border. In any case, just about any thing you could do with OS-9 Level I on the Color Computer, you can do better with OS-9 Level II.

The difference between the OS-9 Level I and OS-9 Level II manuals is like day and night. The new manual is so large it will not fit in a standard binder. The 200-plus pages lie flat in the supplied binders, which makes them easy to use.

This manual is more than 3 inches thick and has an excellent table of contents and a thorough index in each section. Dividers named Getting Started, OS-9 Commands, Technical Reference and Windows let you find the information you need about the operating system. Additionally, a section named BASIC09 and an accompanying glossary will make it easy for you to learn this powerful high level language.

The type style used in the manual is easy to read, and the designers used plenty of white space to take your eye where it should go on the page. The organization is clear and logical, and is much easier to follow than the Level I manuals. The Getting Started section shows you how to create a new window or two.

One of the features that consumers and reviewers alike demand these days is onscreen help. OS-9 delivers it with the utility command named `help`. If you forget how to run one of the standard OS-9 utilities, you need only type `help` followed by the name of the command. The help comes from a specially formatted text file in a file named `helpmsgs` in the directory `/dd/SYS`.

OS-9 Level II should be much easier to use than OS-9 Level I. With a total of 512K of memory and separate 64K address spaces for the system and each individual process, you will find life much easier. In fact, most of the problems beginners have encountered with OS-9 revolve around the limited memory resources of the Level I system. They ran out of memory before they ran out of ideas. Then, they didn't understand the cryptic error messages.

OS-9 is a very complex and powerful operating system. For this reason, it will take you quite a while to pick up on all the tricks. However, OS-9 command names are very logical and their syntax simple, if you use the default parameters and don't try to do anything fancy for the first week or two. After you are comfortable with the system, you can call in the many available parameters and get down to some fancy work.

Ease of use is a completely different story. Once you have learned the basics, you will uncover more power every time you turn on the computer. Shortcuts can be found everywhere. You'll find yourself typing less and enjoying your computer more. OS-9's anonymous directories, coupled with its concept of current data and execution directories, and its hierarchical file structure, make it easy to organize programs and data.

The command line editor makes it easy to execute redundant commands with little typing. Procedure files do the typing in many cases, and pipelines let you run three or four processes concurrently to do one big job. With OS-9 Level II, you have plenty of memory to set up some nice pipelines. Even large programs running in BASIC09 can be inserted in a pipeline; each process in line can have up to 64K of space to use.

OS-9 Level II prints an error number when it encounters a problem. After a few days you will recognize all the common errors. Until you do, you can use the OS-9 `error` command utility. Just type `error`, followed by the number reported by the system, and OS-9 will return an English language explanation of that number. These messages, while short, are easy to understand. The secret is — relax, lean back and ask yourself, "What did I do that caused this condition?" Ninety-nine times out of a hundred you will find you forgot something when you typed the command.

Because of its versatility, power and extremely low price, OS-9 Level II has to be the best bargain on any computer, anywhere. The addition of MultiVue's point-and-click interface, and the standardization of application software it will force, will make OS-9 even more a bargain in the near future. When OS-9 MultiVue happens, you won't even realize you are running OS-9 — unless you want to — and you certainly won't want to be without it.

(Tandy Corporation. Available in Radio Shack stores nationwide, $79.95)

It's Marble Mania with *Roller Controller*

Roller Controller is an arcade-type game written especially for the CoCo 3. It works with either 128K or 512K and is available on cassette or disk. The deluxe two-button joystick is recommended, but the game can be played using the keyboard. The program is not copy-protected so a backup can be made for protection. The disk version contains a BASIC loader, but the game itself is written in machine language. The program can be booted up using the DOS command, if you have Disk BASIC Version 2.1 or higher; otherwise, just type `RUN "ROLLER"`.

The game is written for either RGB or Composite monitors, and this selection is made when the game first starts. If you are using a TV set, you want to select the composite mode so the colors come out right.

Roller Controller uses the highest resolution graphics mode available on the CoCo 3. You can expect excellent colors and detail. The game contains six different and increasingly difficult screens, each of which contains a maze of sloping planks and trap doors. Colored marbles are released at the top of each maze and roll down the planks. You must guide the various colored marbles by opening and closing the trap doors at just the right time, so the marbles drop into an appropriate bin at the bottom of the screen. Three levels of play are available. I played level one and after a few games I was able to qualify for a spot on the high games screen. At harder levels more than one marble rolls even faster down the planks at the same time. This is sure to challenge the most gifted arcade game player.

The solid colored marbles are marked with a 'T'. These must be guided into one of three identically colored bins at the bottom of the screen. "Ringer" marbles are a combination of three colors and must be guided into one of two large funnels at the bottom of the screen. If you see you are going to miss the correct bin or funnel, you can, if you are quick enough, recycle the marble to the top of the screen by guiding it off to the extreme right or left side where a fan will blow the marble back up to the top plank. You have to be careful with this feature because the marbles roll faster as a result of being blown back to the top.

"Happy" and "sad" faces at the upper-right of the screen are used to tell you how many marbles must be guided into the correct bins before the current screen is completed. The sad face will tell you how many "mistakes" you are allowed before the game is over. You get 50 points for each colored marble that goes into the correct bin but none for the ringer marbles. You also get 50 points for each unused mistake marble at the end of a screen. Bonus points are awarded at the conclusion of each wave consisting of a pattern of 10, 11, or 12 screens depending on the skill level.

Roller Controller is great fun. It's a unique diversion from the typical "shoot-'em-up" fare and will keep you on the edge of your CoCo seat for hours. In spite of its tame theme, it's one of the most challenging and unique games I've seen for the CoCo 3.

(Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY, 11414, $29.95 plus $3 S/H)

— Jerry Semones

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BOBO BOLD
BOOKS
Cartwheel
Fine Print
Normande Small
Normande Medium
NORMANDE LG.
Plano
SINALOA
sukiyaki

SET 2

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Harlow
Koloss
maharajah
MUSIEGO
Peignot Small
Peignot Large
PROGRAM SMALL
PROGRAM MEDIUM
PROGRAM LARGE
ROCK&ROLL
Futura Black Small
FUTURA BLK. LG
HANG UP
KEYBOARD
LIQUID CRYSTAL
Мосцоя Смелл
Мосцоя Ларге
ORBIT
POINT OUT
Printout Small
PRINTOUT LARGE
STOP

SET 3

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Old English
PIONEER
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XERXES MEDIUM
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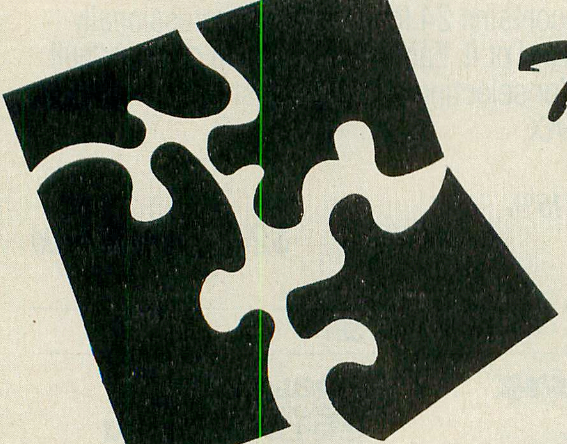
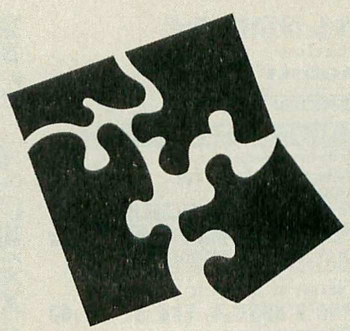
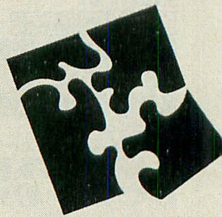


This One's a Puzzler

By Benjamin W. Brunotte





Always on the lookout for new games, I decided to create some of my own, so I wrote *Word Search*. This program is a word search puzzle maker. It requires 32K with or without a disk drive. It is written in BASIC, and no commands need to be entered before loading or running.

Word Search will take a list of up to 25 words and hide them in a word search puzzle. The puzzle size can range from 5 by 5 letters to 30 by 30 letters. Be sure to use a puzzle size large enough to hide all the words. The words will be hidden horizontally, vertically and diagonally, and may be spelled forward or backward, but always in a straight line.

I have included many comments, so memory can be saved by removing them. The maximum number of words allowed in the word list is 25 (because of memory limitations).

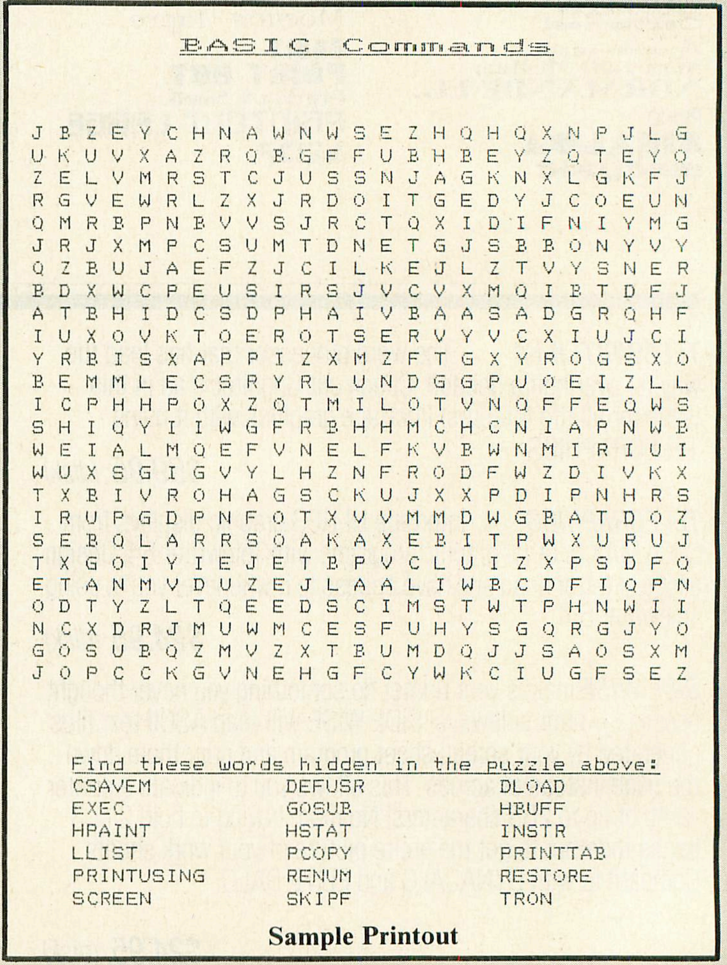
When entering the words, use a period to indicate the end of the list. Entering a hyphen lets you redo the previous word. Spaces are ignored. Thus, you can enter "New York," but it will be hidden as "NewYork."

The array `DD` is weighted toward the diagonal. `DD(1)` through `DD(24)` put a word on the diagonal, and `DD(25)` through `DD(28)` put a word either horizontally or vertically. If a word will not fit in any direction, you are given the choice of either beginning another puzzle in hopes the word will fit in the new one or dropping the word from the list and continuing with the present puzzle.

When the puzzle is completed, the solution is printed first. Then, all the hyphens (indicating spaces) are replaced with random letters, and the word search puzzle is printed.

I hope you enjoy *Word Search*. I have tried to make it as easy to follow as possible. As written, this program is designed to work with Radio Shack DMP printers. For those with other printer makes, all printer control codes are on separate lines and are identified with comments. ☐

Ben Brunotte lives in Nederland, Texas, and works in operations at a large oil refinery. He is a self-taught programmer, and the CoCo is his hobby.



```
                 BASIC Commands

J B Z E Y C H N A W N W S E Z H Q H Q X N P J L G
U K U V X A Z R O B G F F U B H B E Y Z Q T E Y O
Z E L V M R S T C J U S S N J A G K N X L G K F J
R G V E W R L Z X J R D O I T G E D Y J C O E U N
Q M R B P N B V V S J R C T Q X I D I F N I Y M G
J R J X M P C S U M T D N E T G J S B B O N Y V Y
Q Z B U J A E F Z J C I L K E J L Z T V Y S N E R
B D X W C P E U S I R S J V C V X M Q I B T D F J
A T B H I D C S D P H A I V B A A S A D G R Q H F
I U X O V K T O E R O T S E R V Y V C X I U J C I
Y R B I S X A P P I Z X M Z F T G X Y R O G S X O
B E M M L E C S R Y R L U N D G G P U O E I Z L L
I C P H H P O X Z Q T M I L O T V N Q F F E Q W S
S H I Q Y I I W G F R B H H M C H C N I A P N W B
W E I A L M Q E F V N E L F K V B W N M I R I U I
W U X S G I G V Y L H Z N F R O D F W Z D I V K X
T X B I V R O H A G S C K U J X X P D I P N H R S
I R U P G D P N F O T X V V M M D W G B A T D O Z
S E B Q L A R R S O A K A X E B I T P W X U R U J
T X G O I Y I E J E T B P V C L U I Z X P S D F Q
E T A N M V D U Z E J L A A L I W B C D F I Q P N
O D T Y Z L T Q E E D S C I M S T W T P H N W I I
N C X D R J M U W M C E S F U H Y S G Q R G J Y O
G O S U B Q Z M V Z X T B U M D Q J J S A O S X M
J O P C C K G V N E H G F C Y W K C I U G F S E Z


   Find these words hidden in the puzzle above:
   CSAVEM              DEFUSR              DLOAD
   EXEC                GOSUB               HBUFF
   HPAINT              HSTAT               INSTR
   LLIST               PCOPY               PRINTTAB
   PRINTUSING          RENUM               RESTORE
   SCREEN              SKIPF               TRON
```

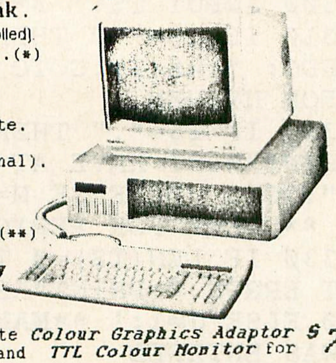
Sample Printout

180	20
240	2
330	171
430	200
560	111
640	131
780	50
890	27
END	41

The listing: WDSEARCH

```
10 '*****************************
20 '*                           *
30 '* WORD SEARCH PUZZLE MAKER *
40 '*   BY BENJAMIN BRUNOTTE    *
50 '*      COPYRIGHT 1987       *
60 '*                           *
70 '*****************************
80 PMODE 0,1:PCLEAR 1:' **FREE U
P MORE MEMORY
90 CLEAR 14000:CLS:DIM A$(30,30)
,W$(25),DX(8,2),DD(28):K=RND(-TI
MER):' **RESERVE STRING SPACE &
DIMENSION ARRAYS
100 ' ***SET UP ARRAYS FOR PICKI
NG DIRECTION TO PLACE WORD IN PU
ZZLE
110 FOR I=1 TO 8:READ DX(I,1),DX
(I,2):NEXT I
120 FOR I=1 TO 28:READ DD(I):NEX
T I
130 DATA 0,1,1,1,1,0,1,-1,0,-1,-
1,-1,-1,0,-1,1
140 DATA 2,4,6,8,2,4,6,8,2,4,6,8
,2,4,6,8,2,4,6,8,2,4,6,8,1,3,5,7
150 ' ***INSTRUCTIONS
160 CLS:PRINT@167,"WORD SEARCH P
UZZLE":PRINT:PRINT:PRINT"DO YOU
NEED INSTRUCTIONS (Y/N)?"
170 IK$=INKEY$:IF IK$="Y" THEN C
LS ELSE IF IK$="N" THEN CLS:GOTO
 220 ELSE 170
180 PRINT"   THIS PROGRAM IS A W
ORD SEARCHPUZZLE GENERATOR!  THE
 PROGRAM  TAKES A LIST OF WORDS,
 REMOVES   ANY NON-ALPHABETICAL C
HARACTERS EXCEPT SPACES, AND BUI
LDS A WORDSEARCH PUZZLE WITH THE
M.":PRINT
190 PRINT"   IF THE COMPUTER CAN
 NOT FIT AWORD IN THE PUZZLE, IT
 WILL ASK IF YOU WANT TO START O
VER.  THE WORD WILL BE DROPPED F
ROM THE   LIST IF YOU ANSWER 'N0
'.  IF    NECESSARY, TRY USING F
EWER WORDSOR A LARGER PUZZLE SIZ
E."
200 PRINT:INPUT"   PRESS enter T
O START....";IK$:CLS
210 ' ***SET UP PUZZLE
220 FOR I=1 TO 25:W$(I)="":NEXT:
CLS:' **CLEAR WORD LIST ARRAY
230 PRINT:PRINT:INPUT"WIDTH OF P
UZZLE: ";W:MD=W:IF W>30 THEN PRI
NT"TOO WIDE.  MUST BE 30 OR LESS
.":GOTO 230 ELSE IF W<5 THEN PRI
NT"MUST BE AT LEAST 5 WIDE.":GOT
O 230:' **SET PUZZLE WIDTH
240 PRINT:PRINT:INPUT"LENGTH OF
PUZZLE: ";L:IF L>W THEN MD=L
250 IF L<5 THEN PRINT"MUST BE AT
 LEAST 5 LONG.":GOTO 240 ELSE IF
 L>30 THEN PRINT"TOO LONG.  MUST
 BE 30 OR LESS.":GOTO 240:' **SE
T PUZZLE LENGTH
260 PRINT:PRINT:PRINT"ENTER A HE
ADING TO BE PRINTED   AT THE TOP
 OF THE PUZZLE.      (40 CHARAC
TERS MAXIMUM)":LINE INPUT HD$:IF
 LEN(HD$)>40 THEN PRINT"TOO MANY
 CHARACTERS.":GOTO 260:' **INPUT
 HEADING FOR PUZZLE
270 ' ***INPUT WORD LIST
280 CLS:PRINT:PRINT:PRINT"  THER
E MUST BE AT LEAST 2 WORDSIN THE
 LIST AND NOT MORE THAN   25.":P
RINT"  ENTER A WORD AT EACH QUES
TION MARK.":PRINT"  TO REDO THE
PREVIOUS WORD,    TYPE A HYPHEN
(-).":PRINT"  WHEN FINISHED, TYP
E A PERIOD  (.)."
290 FOR I=1 TO 25:PRINT"NEXT WOR
D: ";
300 INPUT T$:' **INPUT A WORD
310 IF T$="-" THEN I=I-1:PRINT"R
EDO: ";W$(I):GOTO 300:' **CHECK
FOR HYPHEN
320 IF T$="." THEN IF I<3 THEN P
RINT"MUST HAVE AT LEAST 2 WORDS.
":GOTO 300 ELSE M=I-1:GOTO 490:'
 **CHECK FOR PERIOD
330 IF LEN(T$)=0 THEN PRINT"INPU
T ERROR.":PRINT"REDO: ";:GOTO 30
0 ELSE J=1:' **MAKE SURE A WORD
WAS ENTERED
```

```
340 TE$=MID$(T$,J,1):IF TE$<"A"
OR TE$>"Z" THEN 360:' **CHECK FO
R LETTERS ONLY
350 J=J+1:IF J<=LEN(T$) THEN 340
 ELSE 410:' **DONE?
360 IF TE$=T$ THEN T$="":GOTO 33
0:' **ONLY 1 NON-ALPHABETICAL CH
ARACTER IN WORD
370 IF TE$=" " THEN 350:' **SKIP
 IF A SPACE
380 IF J=LEN(T$) THEN T$=LEFT$(T
$,J-1):GOTO 410:' **REMOVE NON-A
LPHA CHARACTERS
390 IF J=1 THEN T$=RIGHT$(T$,LEN
(T$)-1):GOTO 340
400 T$=LEFT$(T$,J-1)+RIGHT$(T$,L
EN(T$)-J):J=J-1:GOTO 350
410 IF LEN(T$)>MD THEN PRINT"WOR
D IS TOO LONG.":PRINT"REDO: ";:G
OTO 300:' **CHECK IF WORD TOO LO
NG FOR PUZZLE
420 ' ***CHECK WORD LIST FOR DUP
LICATE WORD
430 IF I=1 THEN 460:' **SKIP CHE
CK IF FIRST WORD
440 FOR K=1 TO I-1:IF W$(K)=T$ T
HEN PRINT"DUPLICATE WORD.":PRINT
"REDO: ";:GOTO 300
450 NEXT K
460 W$(I)=T$:CLS:PRINT"WORD LIST
 :":FOR K=1 TO I:PRINTW$(K),:NEX
T K:PRINT:' **PRINT WORD LIST ON
 SCREEN
470 NEXT I:M=25
480 ' ***PUT WORDS IN PUZZLE
490 CLS0:PRINT@199,"one";CHR$(12
8);"moment";CHR$(128);"please";:
FOR J=1 TO L:FOR K=1 TO W:A$(J,K
)=CHR$(45):NEXT K:NEXT J:' **PUT
 HYPHENS IN ALL PUZZLE SPACES
500 CLS:PRINT@37,"BUILDING THE P
UZZLE.":FOR I=1 TO M-1:FOR J=I+1
 TO M:IF LEN(W$(I))<LEN(W$(J)) T
HEN W$(0)=W$(I):W$(I)=W$(J):W$(J
)=W$(0):' **ARRANGE WORDS LONGES
T TO SHORTEST
510 NEXT J,I
520 FOR I=1 TO M:PRINT@37,"BUILD
ING THE PUZZLE.":PRINT:PRINT"WOR
KING ON WORD ";W$(I):LN=LEN(W$(I
)):NT=0
530 SD=DD(RND(28)):' **SELECT DI
RECTION AND STARTING SPACE FOR W
ORD
540 SX=RND(W):X1=SX+(LN-1)*DX(SD
,1):IF X1<1 OR X1>W THEN 530
550 SY=RND(L):X1=SY+(LN-1)*DX(SD
,2):IF X1<1 OR X1>L THEN 530
560 NT=NT+1:IF NT<>W*L*2 THEN 59
0:' **NUMBER OF TRIES TO PUT WOR
D IN PUZZLE
570 PRINT:PRINT"CAN NOT FIT ",W$
(I)," IN THE PUZZLE.":PRINT"STAR
T OVER (Y/N)?":' **START OVER OR
 DROP WORD
580 IK$=INKEY$:IF IK$="Y" THEN C
LS:PRINT@8,"STARTING OVER":GOTO
520 ELSE IF IK$="N" THEN CLS:PRI
NT@96,W$(I);" REMOVED.":W$(I)=""
:GOTO 650 ELSE 580
590 J=SY:K=SX:FOR P=1 TO LN:IF A
$(J,K)=CHR$(45) OR A$(J,K)=MID$(
W$(I),P,1) THEN 600 ELSE IF MID$
(W$(I),P,1)=" " THEN 610 ELSE 53
0:' **CHECK IF WORD FITS AND SKI
P SPACES
600 J=J+DX(SD,2):K=K+DX(SD,1)
610 NEXT P
620 J=SY:K=SX:FOR P=1 TO LN:IF M
ID$(W$(I),P,1)=" " THEN 640 ELSE
 A$(J,K)=MID$(W$(I),P,1):' **REP
LACE HYPHENS WITH LETTERS OF WOR
D IF IT FITS AND SKIP SPACES
630 J=J+DX(SD,2):K=K+DX(SD,1)
```



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```
640 NEXT P
650 NEXT I
660 TB=(80-(2*W))/2:' **TAB SETT
ING FOR 80 COLUMN PRINTER
670 POKE 150,41:' **1200 BAUD
680 CLS:PRINT"READY PRINTER TO P
RINT PUZZLE.":INPUT"HOW MANY COP
IES";CP
690 PT=1:' **SET PRINT COUNTER T
O 1
700 FOR I=1 TO M-1:FOR J=I+1 TO
M:IF W$(J)<W$(I) THEN W$(0)=W$(I
):W$(I)=W$(J):W$(J)=W$(0):' **PU
T WORDS IN ALPHABETICAL ORDER
710 NEXT J,I:X$="SOLUTION"
720 PRINT#-2,CHR$(27);CHR$(18);:
' **NORMAL CORRESPONDENCE PRINT
730 PRINT"PRINTING ANSWER COPY";
PT:GOSUB 800:IF PT<CP THEN PT=PT
+1:GOTO 730:' **PRINT EACH COPY
740 PRINT"FILLING IN PUZZLE.":FO
R J=1 TO L:FOR K=1 TO W:IF A$(J,
K)=CHR$(45) THEN CK=RND(26)+64:A
$(J,K)=CHR$(CK):' **REPLACE HYPH
ENS WITH RANDOM LETTERS
750 NEXT K,J
760 PT=1:X$=" ":' **RESET PRINT
COUNTER
770 PRINT"PRINTING PUZZLE COPY";
PT:GOSUB 800:IF PT<CP THEN PT=PT
+1:GOTO 770:' **PRINT EACH COPY
780 CLS:PRINT:PRINT:PRINT:PRINT:
PRINT:PRINT" N = NEW PUZZLE":PRI
NT:PRINT" Q = QUIT":PRINT:PRINT"
PRESS KEY FOR CHOICE....."
790 IK$=INKEY$:IF IK$="N" THEN R
UN ELSE IF IK$="Q" THEN END ELSE
 790
800 PRINT#-2,CHR$(13);CHR$(13);C
HR$(13);CHR$(13):PRINT#-2,TAB((8
0-(2*LEN(HD$)))/2);:' **CENTER H
EADING 5 LINES FROM TOP OF PAPER
810 PRINT#-2,CHR$(15);:' **UNDER
LINE
820 PRINT#-2,CHR$(27);CHR$(14);:
' **ELONGATION
830 PRINT#-2,HD$;:' **PRINT HEAD
ING
840 PRINT#-2,CHR$(14);:' **END U
NDERLINE
850 PRINT#-2,CHR$(27);CHR$(15):'
 **END ELLONGATION
860 PRINT#-2,TAB((80-LEN(X$))/2)
;X$;CHR$(13);CHR$(13)
870 FOR J=1 TO L:PRINT#-2,TAB(TB
);:' **CENTER EACH LINE
880 FOR K=1 TO W:PRINT#-2,A$(J,K
);" ";:NEXT K:' **PRINT EACH LET
TER IN A LINE
890 PRINT#-2,CHR$(13);:NEXT J
900 FOR I=1 TO 3:PRINT#-2:NEXT I
:B$="Find these words hidden in
the puzzle above:":DD=(80-LEN(B$
))/2:PRINT#-2,TAB(DD);:' **CENTE
R MESSAGE 3 LINES DOWN
910 PRINT#-2,CHR$(15);:' **UNDER
LINE
920 PRINT#-2,B$;
930 PRINT#-2,CHR$(14):' **END UN
DERLINE
940 MD=0
950 ' ***PRINT WORD LIST IN COLU
MNS BELOW MESSAGE
960 FOR I=1 TO M:IF W$(I)="" THE
N 1000
970 PRINT#-2,TAB(DD+MD);W$(I);
980 MD=MD+16:IF MD=48 THEN MD=0:
PRINT#-2,CHR$(13);
990 IF POS(-2)>MD+DD THEN MD=MD+
16:GOTO 980
1000 NEXT I
1010 PRINT#-2,CHR$(12);:' **PRIN
TER FORM FEED
1020 RETURN
```

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Code Buster **machine language disassembler**
Three terrific programs to explore machine language. Screen or printer accurate disassembly of binary code. Simple prompted procedure with some instruction to dissect and understand your ROMs. Fully documented for only $19.95 ($24.95 CDN.)

The Hardware Project Basics Review

By Tony DiStefano
Rainbow Contributing Editor

Recently it was brought to my attention that some readers of my column seem to be having a bit of trouble constructing the projects. When I bought my first CoCo, the first thing I did when I got it home was take the cover off to see what made it tick. I spent many hours inside the CoCo and many hours reading technical manuals on how the different components of a computer work. I also spent a lot of time with a soldering iron, soldering things together and taking them apart again. In short, I have a lot of experience with the CoCo and computers.

A lot of people use the CoCo as a means to an end. They are not hardware hackers. Other people are hobbyists who want to dig in and learn all about the insides of the computer. Whatever background you have with computers, or whatever electronics experience you have, I am sure you will agree that digging inside a computer requires a little skill and a lot of patience. Here are a few hints and tips on how to sucessfully complete a project.

The first and most important factor to consider is the project itself. Ask yourself, will it suit my needs? Is it within my budget? Will I learn anything from it? If all the answers are yes, then you can proceed. Once you have decided to tackle the project, you must learn all you can about it before you begin. It is important to read the whole article before you start. Make sure you understand the object of the project and the skills required. If there are parts you don't understand, study them over and over. Refer to other articles of the same nature or reference books that touch on that subject. Technical data books are readily available from your local electronics distributor. Texas Instruments and Motorola have excellent books on understanding microprocessors, as well as technical data manuals. Never start a project if you are not sure you can finish it or if you do not fully understand the whole project, start to finish.

Once you have read the article and are confident you can finish it, the next step is parts. Make a list of all the parts you will need. Then do your shopping. If you are missing a part or two, don't start the project. Not only is it frustrating to have to stop because you are missing a part, but you lose the momentum of the project. Returning to a project after a while may cause you to skip a step. You may even lose interest and give up the project all together. So don't start until all the parts are in.

Another point you must consider is whether you have all the tools you need. Projects that require you to build some kind of hardware gizmo require tools. Make sure you have all the tools necessary to build your project. If mounting parts requires you to drill a hole, make sure you have the right size drill bit and that it's sharp. A sharp bit (or whatever the tool) is easier to work with; you don't have to force a sharp bit into a sheet of metal. A dull bit will drift before it cuts and may cause damage to the project and to you.

When you are about to start a project, take time to clear a good place to work. The work area must be free for the entire time it takes to do the project. If it is going to take more than one day to do, make sure that you will not need the work place for something else. It is too easy to lose or break something if you have to put the computer and all the loose parts aside to repair the toaster. This way, you can continue exactly where you left off. If the project has a complex circuit or a lot of instructions, it may be wise to photocopy the article and staple the article together. This way you don't have to worry about getting your magazine dirty, torn or worn.

OK, you have all the parts, a clean workplace and all the tools necessary to do the project. Take things one step at a time. Build, cut, solder and do whatever is required of the project. At this time, it may be wise to consider the well-being of your computer. Some projects may require you to cut, bend, or modify the computer's PCB (Printed Circuit Board). Now, cutting a PCB may be quite permanent. Before you cut, look around to make sure you will not accidentally cut other things. Also, make your cut in a place that is accessible enough that you can rewire that cut, if you need to.

Removing ICs is a tricky task. There are more versions of the CoCo than there are versions of *PacMan*, and every one of them is different. On the older CoCo 1s, almost all the chips are socketed. The contrary is true for the newer CoCo 3s; almost all the chips are soldered directly to the PCB.

Special consideration must be given to this situation. If the project requires that you lift, bend or cut a pin on an IC that is soldered in, you have two choices. Both of them are a pain. The first choice is to cut the pin and solder it to the stub. If you don't do it right, the pin will break off. Also be careful not to short-circuit to the next pin.

The other way is a bit longer. It requires you to completely remove the

---

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

chip, which is a very hard procedure to follow. A lot of soldering experience is required. Most people use a soldering iron and some solder wick. Heat each pin (one at a time) until the solder flows. Remove the iron, lay the wick onto the pin and press the iron on top. The wick will draw the solder and leave the pin and hole empty. Do each pin one at a time. Then remove the chip and clean the pins with the same stuff. Now, insert a socket where the chip was and solder it into place. Remember to position the socket so that Pin 1 of the socket matches Pin 1 of the chip.

When at all possible, if the instructions of the project require you to solder to an IC or bend the pin of an IC, use a socket instead. Remove the IC in question, insert the IC into a good quality socket and treat the pins of the socket like the pins of the IC. This way, if you break a pin off, all you have to do is replace the socket and not the chip.

When you are finished, don't jump right in and try it. Take time to clean up your bench, put your tools away and check your work. Go over the project step by step again. Make sure all wires are properly soldered, components are all in their proper places, and there are no short circuits on your project. Before you plug in your project, blow the dust and shavings out of the computer. If you don't have anything to blow with, hold the computer or project upside-down and gently tap the bottom of the computer. This will dislodge any bits of drill shavings or wire that may have fallen into the computer. Now put the thing together and try it out.

Plug all connectors and wires in and connect the power to the computer. Turn the TV or monitor on first; do not connect anything that is not necessary for the operation of the project you are testing. For instance, if you don't need to have the disk controller plugged in, leave it out. Then if you do have a problem, you will at least have saved your controller from abuse. Turn the computer on and watch the monitor. The familiar CoCo screen should appear. Pay close attention to the monitor; if you suspect something is wrong, turn the computer off right away.

> ***"If you are certain your work is good, but it still doesn't function, look at the circuit diagram."***

Don't panic! Go over your work step by step. Check all your connections. Check for chips that have been installed backward, or transistors or diodes that have been reversed. Depending on the type of solder you use, a deposit will be left behind after you solder. This can act as a conductor at high CPU clock speeds. It must be cleaned off. Use a recommended flux remover. Remember, some of the stronger flux remover can melt plastic. Don't clean it on your work table. Go outside or to the sink in the laundry room.

If you are certain your work is good, but it still doesn't function, look at the circuit diagram. There may be a way to check only a section of the project at a time. Fall back on the theory of the circuit, and if you have some test equipment, check for proper voltages on the power supply and ground. If all else fails, restore the computer to what it was before you started and make sure it still works. Once you know the computer works, check the project carefully and try it again.

A few articles ago, I showed you how to interface the MC6847T1 chip into the older CoCos. One of the chips required rewiring. I had the diagram for the computers I had, but not all of the computers are the same. A couple of readers sent me the pinouts to this chip. I have not tried these out, but I am passing them along to you anyway. You are on your own to verify whether they work.

The first is from John A. Lind of Corona, Calif., whom I met at the Color Expo 87. The computer in question is the CoCo 2, Catalog No. 26-3127. The board markings are 8709416 Rev B DWG NO. 1700235. The jumpers for the U5 (74LS273) socket are as follows:

FROM	TO
3	15
4	12
7	6
8	9
13	6
14	2
17	19
18	16

PRINTERS!

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Thanks to the elfin magic going into RAINBOW ON DISK, part of one side of the disk is formatted for the OS-9 operating system. That means that you can now get all the OS-9 programs from the magazine — programs that cannot be put on tape. And, with the introduction of the new CoCo 3, OS-9 programs will become more and more prevalent.

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RAINBOW ON DISK and RAINBOW ON TAPE are not stand-alone products, but are intended as adjuncts and complements to the magazine. Even if you purchase RAINBOW ON DISK or RAINBOW ON TAPE, you will still need the magazine for loading and operating instructions. For information on RAINBOW ON TAPE, see Page 190.

To order by phone (credit card orders only), call (800) 847-0309, 8 a.m.to 5 p.m. EST. All other inquiries call (502) 228-4492.

Added notes: Pins 10, 11, and 20 are used for clock, +5V and GND. No jumper to the SAM chip is necessary.

The second diagram is from Mr. Ralph Fox of New Zealand. Mr. Fox wrote: "Although your column did not mention it, it is also necessary to bend up Pin 12 of the 6847T1 VDG as well as Pin 31. The reason is Pin 12 is connected to Pin 37 ($\overline{FS}$) on the CoCo's main circuit board; so if you jumper Pin 12 of the new VDG to Pin 10 ($\overline{WE}$) of the SAM, you will get contention between the VDG's $\overline{FS}$ output and the SAM's $\overline{WE}$ output."

CoCo-1 E boards (boards numbered 8709137-E)

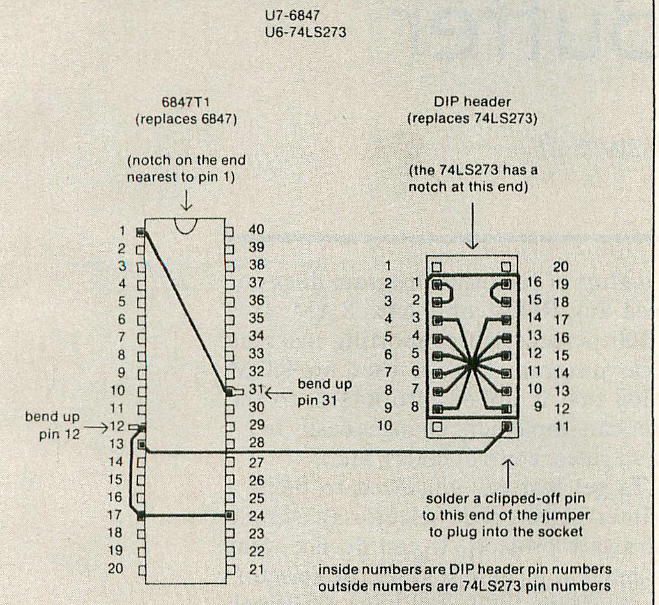
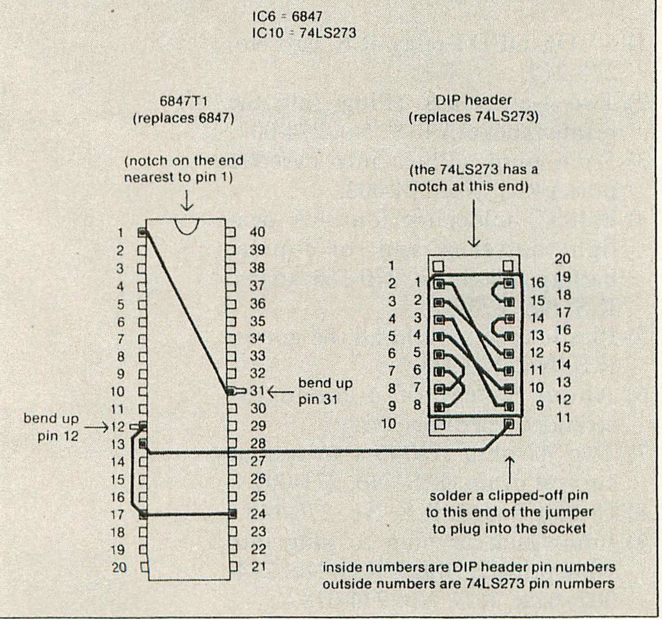

U7-6847
U6-74LS273
6847T1
(replaces 6847)
DIP header
(replaces 74LS273)
(notch on the end nearest to pin 1)
(the 74LS273 has a notch at this end)
bend up pin 31
bend up pin 12
solder a clipped-off pin to this end of the jumper to plug into the socket
inside numbers are DIP header pin numbers
outside numbers are 74LS273 pin numbers

Figure 1 shows Mr. Fox's diagram on how to wire the CoCo 1 'E' board. Figure 2 shows how to wire the CoCo 2 PAL version. Thank you for these diagrams and information; if I get more, I will pass them on to RAINBOW readers.

CoCo-2 PAL version (boards numbered 20261027)


IC6 = 6847
IC10 = 74LS273
6847T1
(replaces 6847)
DIP header
(replaces 74LS273)
(notch on the end nearest to pin 1)
(the 74LS273 has a notch at this end)
bend up pin 31
bend up pin 12
solder a clipped-off pin to this end of the jumper to plug into the socket
inside numbers are DIP header pin numbers
outside numbers are 74LS273 pin numbers

Announcing the Fourth Rainbow Adventure Contest!

We invite all Color Computer enthusiasts to try their hand at writing the perfect Adventure. It might be a 4K, text-only entry, or it might utilize the full power of the CoCo 3. It might be written in BASIC or it might consist entirely of assembly language instructions.

Looking for ideas? You need only examine past issues of THE RAINBOW for plenty of samples and tutorials covering the fine art of creating Adventures.

What will our judges be looking for? Originality counts the most, but several other items are worth noting:

- creativity
- programming efficiency
- clarity of instructions
- ease of use
- vocabulary and grammar
- responsiveness
- level of challenge
- enjoyment

Your submission should include all programs and information needed to set up and run the Adventure. All programs must be sent on tape or disk. Several saves of each program must be included with at least one ASCII save of each. If an Adventure cannot be loaded, it cannot be judged. We will not type in even the shortest of programs! Hard copy of all program listings and instructions must also be included. If your submission involves machine language routines, all source code should be included on the tape or disk. Point out any special features of your Adventure or programming which you feel deserve special attention. Finally, indicate the minimum CoCo system required to run your Adventure and include a complete solution.

Some Hints for the Successful Adventure: The judges will also be concerned with the "publishability" of each Adventure. A shorter program is easier to fit into print (both in The RAINBOW and any subsequent Adventure book) as well as being easier for the reader to type in. Don't use packed lines that can't be listed or `LLIST`ed for the benefit of our readers. Your program should run on standard Radio Shack equipment without requiring any special modifications, and should not rely on commercial software for its execution. The only exception is the use of the OS-9 operating system (Level I and Level II) and BASIC09. If your Adventure uses graphics (which are not necessary for winning), make sure the graphics are self-contained. In other words, don't submit a program that loads several different graphics screens unless those graphics are created by a printable program included in the submission.

In summary, send a complete package. Put the accompanying article, documentation, listings, complete loading insructions, solution and cover letter on paper. Include your name, address and telephone number on each page of all materials. Be sure to write-protect your disk or punch out the tabs on your cassette to avoid accidental erasure, and label each with the name of the program(s) and your name and address. As in any contest, packaging does make a difference.

Your entry must be postmarked no later than August 15, 1987, in error-free condition. Each entrant will receive a free pass to the RAINBOWfest of his or her choice. You may also win one of the many prizes donated by our generous advertisers as well as have your program published in RAINBOW!

Additional Rules: All entries must be original, unpublished and unmarketed works, no "conversions." No programs that have been placed in the public domain will be accepted. Entries become the property of Falsoft, Inc., publisher of THE RAINBOW. The decisions of the judges are final. Duplicate prizes will be awarded in the event of ties. Winning entries will be featured in a future issue of RAINBOW. Address entries to "Adventure Contest Editor" and send to The Rainbow, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059.

64K

Presenting the Smarter-Than-Average Printer Buffer

By Emmett J. Lewis Jr.

What is better than a Color Computer? The answer is easy — two Color Computers. The problem in the past has been what to do with the second CoCo. Well, you are going to like this, especially if you use your printer often.

A printer buffer, by the way, is a hardware device that accepts data from the main computer and stores it. The printer buffer then sends the data to the printer, freeing the main computer for more important tasks. The main computer is the computer you use for word processing or programming.

Suppose you are writing a long program and decide you would like a copy to study. Normally, you would have to wait for your printer to finish typing your program. With a print buffer you can send an entire 64K document in one minute 38 seconds, and let the printer buffer do all the waiting. I made an important discovery after finishing this project — my computer is much better at waiting than I am. I think you will also discover this.

To date, printer buffers cost more than the 64K Extended Color Computer and perform only one function. Now you can have your cake and CoCo too. With *Printbuf* you now have a smarter-than-average 64K printer buffer and a useful computer. *Printbuf* works with disk, tape, BASIC or Extended BASIC. As a matter of fact, this program does not need any ROM, only 64K RAM. It is a 100 percent self-supporting machine code program (i.e., it uses no ROM calls) that is poked into BASIC, so the user can implement changes easily (e.g., baud rates, control codes, etc.).

To get started, you need to build a printer selector/de-selector (a simple hardware project). If you do not want to build a printer selector/de-selector, no problem. You just have to switch cables when you want to download from the computer or send the contents of the buffer to the printer. However, at the very least, you will still need to build a main computer-to-buffer computer cable (extra simple).

To build a printer selector/de-selector, you need the following material:

1) 5 VDC DPDT relay. R.S. Part No. 275-215.
2) Two 4-pin plugs. (Plugs into the printer socket.) R.S. No. 274-007.
3) 5-pin plug. (Plugs into cassette port.) R.S. No. 274-003.
4) Battery holder for four AA penlight batteries and, of course, batteries. R.S. No. 270-383; snaps, R.S. No. 270-325.
5) Plastic case to hold all the goods. R.S. No. 270-231.
6) About 7 feet of 4-conductor stranded telephone wire.
7) Two 47-ohm resistors to reduce current drain. R.S. No. 271-009.
8) Circuit Board. R.S. No. 276-148.
9) Inline jack or plug to plug into your printer. Plugs, R.S. No. 274-007; jack, R.S. No. 274-018.

Emmett J. Lewis Jr. has been an electronics technician for Southwestern Bell Telephone Co. for 13 years. He spends four or five hours a day programming the CoCo and is the author of the WordTriad *word processor.*

All these items can be found at Radio Shack for about $15. Once the items are purchased, assemble them as shown in Figure 2 or Figure 3. Figure 2 is for those who are able to follow schematic drawings using any DPDT relay. Figure 3 is for those who have difficulty with schematics. For Figure 3 to work, you will need the Radio Shack relay. Illustration 1 gives you a general idea of how the finished product is supposed to operate. As you can see, this project will present little difficulty, even for new technicians.

To use *Printbuf*, load in the BASIC program and run it in the extra CoCo you plan to use as the printer buffer. After you run *Printbuf*, it takes a few seconds to poke the program in memory. After the program is poked into memory, *Printbuf* asks if you would like to enter as many as three control codes each time the printer option is selected.

There are many reasons you may need to send a control code to the printer. The reason I put this option in is that the printer selector/de-selector sometimes generates errors in the printer (I have a Gemini 10X with a serial-to-parallel converter) and, if errors are in the printer, they will soon be on the paper. If you select the printer only when there is something to print out, you will not get any errors. The only time you get errors is when you select the printer option and the print buffer is empty.

To avoid errors you may use "Delete last character control codes" (127 for the Gemini). If you choose to have control codes sent to the printer, the next three questions ask what they are. If you only need one code, then answer the next two questions with 0 (press 0). If you do not want control codes sent, press N (no). The next question asks if you would like to change the downloading to buffer baud rate. Normally this should not be changed, but you can do it if you want.

Next, you are asked if your printer is 9600 baud. If not, enter your printer's baud rate by entering the number following the baud rate. For example, for a baud rate of 600, enter 87. Next, you are asked if you would like to save the customized version on disk or tape. If no, press N and *Printbuf* executes. If you press Y (yes), you are asked if you would like to save to disk or tape. If you enter `DISK`, then `PRINTBUF.BIN` is written to disk. If you enter `TAPE`, then *Printbuf* is written to tape.

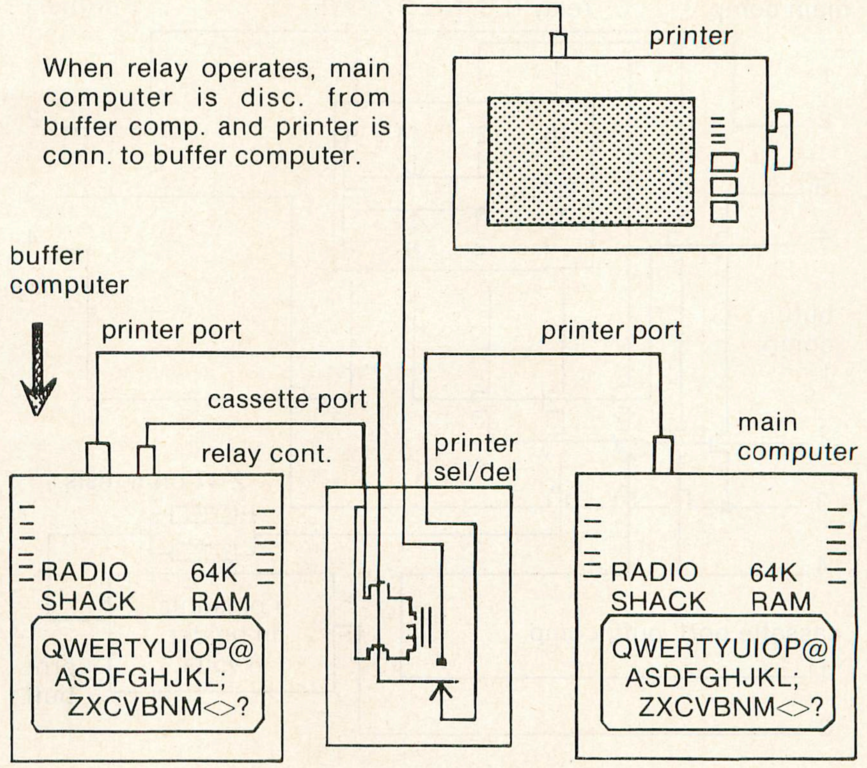

When relay operates, main computer is disc. from buffer comp. and printer is conn. to buffer computer.
printer
buffer computer
printer port
cassette port
relay cont.
printer sel/del
printer port
main computer
RADIO SHACK
64K RAM
QWERTYUIOP@
ASDFGHJKL;
ZXCVBNM<>?
RADIO SHACK
64K RAM
QWERTYUIOP@
ASDFGHJKL;
ZXCVBNM<>?

Figure 1

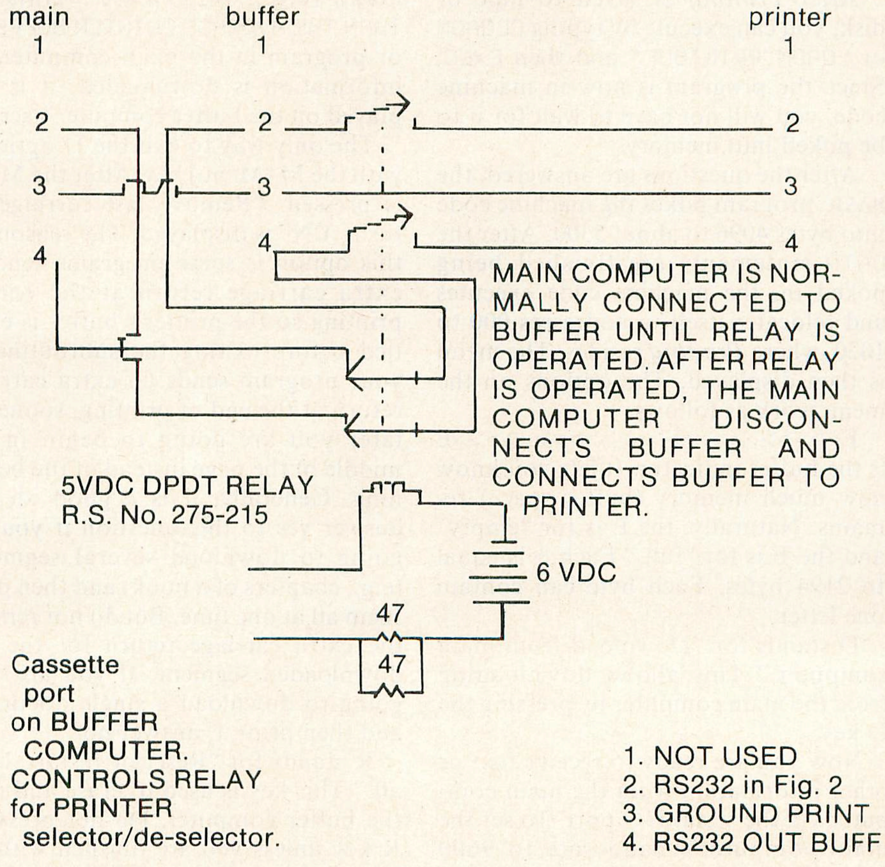

main
1
buffer
1
printer
1
2
2
2
3
3
3
4
4
4
MAIN COMPUTER IS NORMALLY CONNECTED TO BUFFER UNTIL RELAY IS OPERATED. AFTER RELAY IS OPERATED, THE MAIN COMPUTER DISCONNECTS BUFFER AND CONNECTS BUFFER TO PRINTER.
5VDC DPDT RELAY
R.S. No. 275-215
6 VDC
47
47
Cassette port on BUFFER COMPUTER. CONTROLS RELAY for PRINTER selector/de-selector.
1. NOT USED
2. RS232 in Fig. 2
3. GROUND PRINT
4. RS232 OUT BUFF

Figure 2

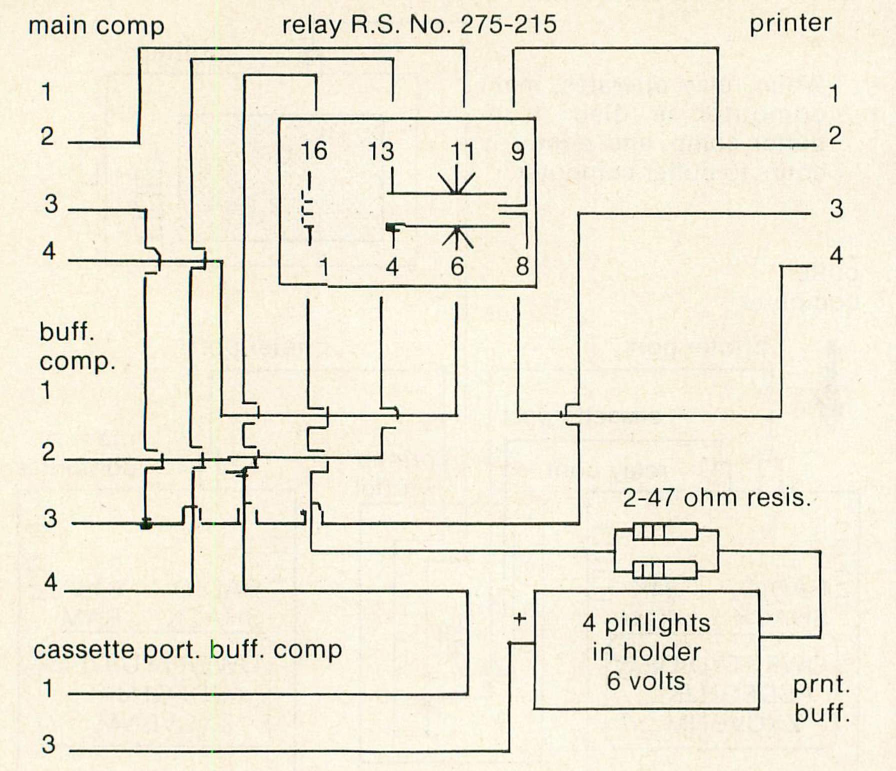


Figure 3

After *Printbuf* is saved to tape or disk, you can execute by typing `CLOADM` or `LOADM"PRINTBUF"` and then `EXEC`. Since the program is now in machine code, you will not have to wait for it to be poked into memory.

After the questions are answered, the BASIC program pokes the machine code into bytes 4096 to about 5300. After the `DATA` statements are finished being poked in, the machine code executes and relocates itself to addresses 000 to 1020, where *Printbuf* resides. The menu is then displayed. The options on the menu work as follows.

F>>>>>>>>>>>>>>>>>>>>>>>>E is the buffer indicator. It lets you know how much memory (buffer space) remains. Naturally, the E is for "empty" and the F is for "full." Each > is equal to 2194 bytes. Each byte can contain one letter.

D stands for "Download from main computer." This allows downloading from the main computer by pressing the D key.

Now you are ready to receive text or other information from the main computer via the serial I/O port. To set the main computer's baud rate to 9600 baud, use the BASIC command `POKE 150,1`. Now, just use any printer command (e.g., `PRINT#-2, "SMARTER THAN THE AVERAGE PRINTER BUFFER"`) or program in the main computer. As information is downloaded, it is displayed on the buffer computer's screen.

The only way to exit the D option is with the M (Menu) key. After the M key is pressed, "Remove last carriage return? Y.N" is displayed. The reason for this option is some programs send an extra carriage return at the end of printing so the printer's buffer is emptied before exiting the subroutine. If your program sends an extra carriage return at the end of printing, sooner or later you are going to begin in the middle of the page instead of the beginning. Generally, it is a good idea to answer yes to this question if you are going to download several segments (e.g., chapters of a book) and then print them all at one time. But do not remove the extra carriage return for the last downloaded segment. If you are only going to download a single document and then print it, answer no.

R stands for "Reset or restart, erase all." This key is used to erase and reset the buffer computer. Do not press the R key unless you are finished with the buffer's contents.

P stands for "Print out contents of buffer." This sends the contents of the buffer to the printer. Do not press this key unless the printer is properly connected and turned on. If you press this key without the printer connected, *Printbuf* will wait until you connect it. The Buffer indicator is continuously updated to let you know how much is left to be printed; only now, each > missing from a full buffer indicates 2194 bytes left to be printed. The print option will automatically exit when the buffer indicator is full. You may exit during printing by pressing the M key.

C stands for "CLEAR &HFF20, release print sub." If, for some reason, you are downloading and run out of memory (you will get a "Buffer full alarm"), *Printbuf* will display the alarm for a short time and automatically return you to the menu. If this happens, you will notice the main computer is still waiting (hung up) for an OK from what it thinks is the printer. It will wait forever unless you release it by pressing the C key. The C key clears $FF20, which tells the main computer the printer is receiving information. Obviously, this is not what's actually happening. The information is placed instead in the bit bucket behind the computer. After pressing the C key, you need to exit the printing subroutine on the main computer.

E stands for "Escape to BASIC *cold start*." When you press this key, "******* Are you sure? ******" is displayed. If you press Y, then you are exited to BASIC and *Printbuf* is gone. If you press N, you get the menu.

When you see "Buffer full alarm, wait for menu," you need to start sending information to the printer until enough buffer space is available for more downloading.

After you have assembled the hardware project, you are ready to test the program and your printer selector/deselector. To prepare for testing, turn on the print buffer CoCo and load in *Printbuf*. Next, make all connections as shown in Figure 1. After you run it following the instructions I've given, you will be looking at the menu. From the menu, press D (download). Now on your main computer type in the following:

```
10 POKE 150,1 'SET BAUD RATE TO
   9600
20 PRINT#-2,"NOW IS THE TIME TO
   TEST MY 64K PRINTER BUFFER"
30 GOTO 20
```

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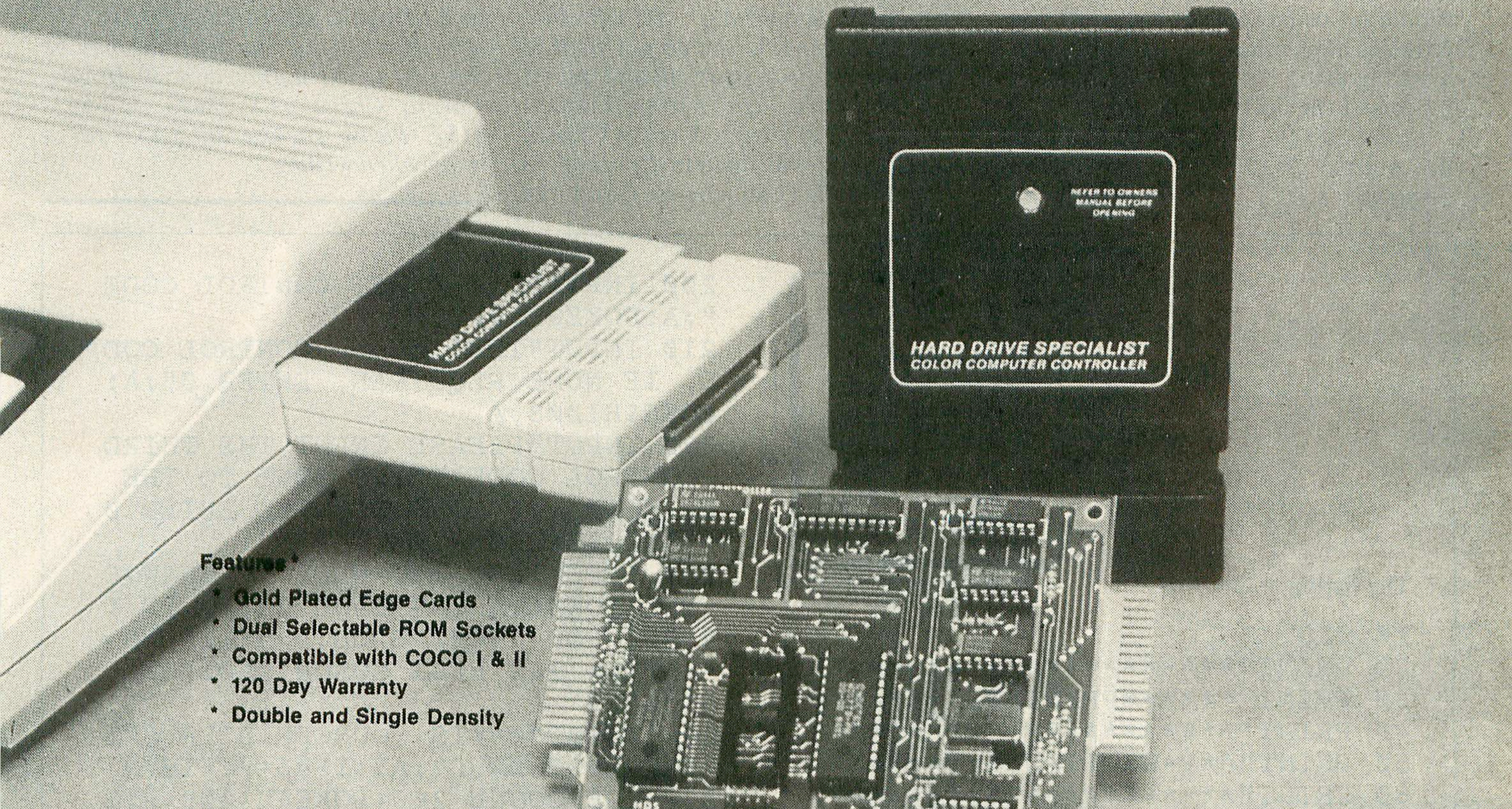
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Next, run this program on the main computer and, as it is running, the buffer computer should be displaying on the screen what you are sending it. As the buffer computer is being filled up, the buffer indicator (F>>>>>E) should be losing some of its >'s. If none of this is happening, you probably have a wiring error between the main computer and the buffer computer.

Soon after the last > is gone, "Buffer full alarm, please wait for menu" is displayed briefly. When the menu returns, press C so you can exit the print program on the main computer by pressing the BREAK key. Next, press P on the buffer computer to print the contents on the printer.

If all your connections are correct, your printer should start. If it does not, check the wiring. If you do not want to build the project yourself and prefer that I build it, send $38 to Emmett Lewis Jr., 4530 Hogan, Corpus Christi, TX 78413. I will include *Printbuf* on tape or disk (you choose) and the completed printer selector/de-selector ready to use (with batteries).

Now you have good reason to buy that extra CoCo. Also, check want ads for a good bargain. As prices continue to fall however, the best bargain might be a new CoCo from Radio Shack.

(Questions about this program may be directed to the author at 4530 Hogan, Corpus Christi, TX 78413, 512-855-0151. Please enclose an SASE for a reply when writing.) ☐

200	45
270	112
530	40
810	160
1000	143
1200	233
1440	51
1600	155
END	145

The listing: PRINTBUF

```
10 CLS
20 PRINT"********************"
30 PRINT"*****PRINTBUF******"
40 PRINT"********************"
50 PRINT"****WRITTEN BY******"
60 PRINT"********************"
70 PRINT"*EMMETT M. LEWIS JR*"
80 PRINT"********************"
90 S = 4096
100 E = 5300
110 X = 5200
120 FOR A = S TO E
130 READ D$
140 V = VAL("&H"+D$)
150 POKE A,V
160 NEXT
170 CLS:PRINT" BECAUSE THE PRINT
ER IS SELECTED AND DESELECTED US
ING A RELAY, SOMETIMES ERRORS AR
E RECEIVED (NO MORE THAN 1 OR 2)
. IF YOU ARE EXPERIENCING ERRORS
, THEN YOU MAY ELECT TO SEND A '
DELETE LAST CHARACTER SENT TO PR
INTER CONTROL CODE'."
180 PRINT"FOR SOME PRINTERS THE
CODE IS 127. PLEASE REMEMBER IF
YOU CHOOSE TO HAVE A CODE SENT (
3 MAX.), IT OR THEY ARE SENT EAC
H TIME YOU PRESS P (P=PRINT OUT
CONTENTS OF BUFFER)"
190 PRINT"DO YOU WISH TO SEND AN
Y CONTROL CODES TO THE PRINTER";
:INPUTA$:IF A$="N"THEN230
200 INPUT"THE FIRST CONTROL CODE
";A:POKE&H1002,A
210 INPUT"THE SECOND CONTROL COD
E, IF NONE REQUIRED, ENTER 0";A:
POKE&H1003,A
220 INPUT"PLEASE INPUT THE THIRD
 CONTROL CODE TO BE SENT TO THE
PRINTER, IF NONE REQUIRD ENTER 0
";A:POKE&H1004,A
230 INPUT"*DO YOU NEED TO CHANGE
 THE DOWNLOADING BAUD RATE? IT I
S SET FOR  9600 BAUD.";A$:IF A$=
"N"THEN 240 ELSE GOSUB 260:POKE&
H1006,A
240 INPUT"***IS YOUR PRINTER SET
 FOR 9600 BAUD";A$:IFA$="Y"THEN
270ELSE GOSUB 260:POKE&H1008,A:G
OTO270
250 GOTO 270
260 INPUT"PLEASE INPUT THE NUMBE
R FOLLOWING THE BAUD RATE TO SEL
ECT THAT BAUD RATE. (EX, TO SELE
CT 600 BAUD ENTER 87)       300=1
80,600=87,1200=41,2400=18,4800=6
,9600=1";A:RETURN
270 INPUT"DO YOU WISH TO SAVE PR
OGRAM ?";A$:IF A$="N"THEN EXEC 5
200
280 INPUT"SAVE TO TAPE OR DISK";
A$:IF A$="DISK" THEN SAVEM"PRINT
BUF/BIN",&H1000,5300,5200
290 IF A$="TAPE"THEN 300 ELSE 28
0
300 CSAVEM"PRINTBUF",4096,5300,5
200
310 EXEC5200
320 END
330 DATA 20,07,00,00,00,00,01,00
340 DATA 01,4F,B7,FF,40,B7,FF,DF
350 DATA 1A,50,10,CE,06,2C,8E,06
360 DATA 40,BF,03,ED,BF,03,F1,BF
370 DATA 03,EF,17,03,6C,B6,FF,21
380 DATA 84,F7,B7,FF,21,8E,01,36
390 DATA 10,8E,04,80,17,00,37,BD
```

```
400 DATA 02,98,CC,F7,01,BD,03,D7
410 DATA 10,27,01,93,CC,FB,04,BD
420 DATA 03,D7,10,27,01,94,CC,FE
430 DATA 04,BD,03,D7,10,27,01,A5
440 DATA CC,EF,01,BD,03,D7,10,27
450 DATA 00,2A,CC,DF,01,BD,03,D7
460 DATA 10,27,02,D9,20,CC,A6,80
470 DATA 27,0C,8D,04,A7,A0,20,F6
480 DATA 81,40,24,03,8B,40,39,81
490 DATA 61,24,01,39,80,20,39,BD
500 DATA 02,E6,20,96,BD,03,91,8E
510 DATA 04,20,86,44,A7,84,BF,01
520 DATA 30,BD,02,98,5F,F7,FF,20
530 DATA 86,DF,B7,FF,02,B6,FF,00
540 DATA 84,02,27,DB,F6,FF,22,57
550 DATA 25,EE,21,5C,4F,34,02,C6
560 DATA 08,8D,4F,21,53,12,12,B6
570 DATA FF,22,47,66,E4,5A,26,F1
580 DATA 35,02,C6,02,F7,FF,20,BE
590 DATA 03,F1,BC,03,EB,26,08,BE
600 DATA 03,ED,BC,03,EF,27,05,30
610 DATA 01,BC,03,EF,10,27,02,B6
620 DATA A7,1F,BF,03,F1,8D,2C,BE
630 DATA 01,30,BD,00,78,8C,05,FF
640 DATA 23,03,8E,04,20,A7,80,C6
650 DATA AF,E7,84,BF,01,30,8D,02
660 DATA 0E,9C,10,21,00,02,8D,00
670 DATA 9E,05,12,12,12,12,30,1F
680 DATA 26,FC,39,BE,03,F3,26,0A
690 DATA 34,02,BD,02,98,35,02,8E
700 DATA 01,A9,30,1F,BF,03,F3,39
710 DATA 04,00,13,88,13,88,20,44
720 DATA 3D,44,4F,57,4E,4C,4F,41
730 DATA 44,20,46,52,4F,4D,20,4D
740 DATA 41,49,4E,20,43,4F,4D,50
750 DATA 55,54,45,52,2E,20,20,52
760 DATA 3D,52,45,53,45,54,20,4F
770 DATA 52,20,52,45,53,54,41,52
780 DATA 54,2C,20,45,52,41,53,45
790 DATA 20,41,4C,4C,20,20,20,50
800 DATA 3D,50,52,49,4E,54,20,4F
810 DATA 55,54,20,43,4F,4E,54,45
820 DATA 4E,54,53,20,4F,46,20,42
830 DATA 55,46,46,45,52,20,20,43
840 DATA 3D,43,4C,45,41,52,20,46
850 DATA 46,32,30,2C,52,45,4C,45
860 DATA 41,53,45,20,50,52,49,4E
870 DATA 54,20,53,55,42,2E,20,45
880 DATA 3D,45,53,43,41,50,45,20
890 DATA 54,4F,20,42,41,53,49,43
900 DATA 20,2A,43,4F,4C,44,20,53
910 DATA 54,41,52,54,2A,20,00,5F
920 DATA F7,FF,20,C6,43,F7,04,00
930 DATA 0E,22,86,00,B7,FF,20,86
```

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

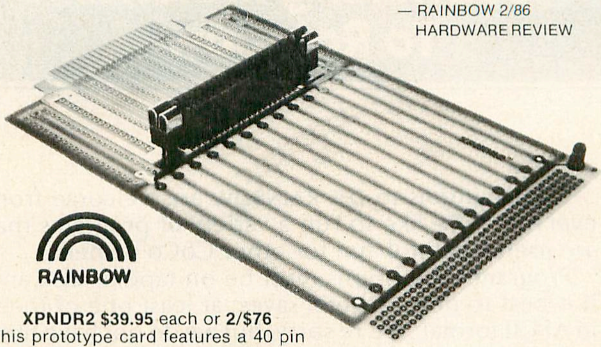
Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest
P.O. Box 385
Prospect, KY 40059

"XPNDR2 and SuperGuide - an Ideal Expansion Card Set"

— RAINBOW 2/86 HARDWARE REVIEW



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```
940 DATA 52,B7,04,00,BE,03,ED,BF
950 DATA 03,F1,BF,03,EF,0E,22,27
960 DATA 03,BD,02,43,39,BD,03,E2
970 DATA 8E,00,00,BD,02,93,C6,50
980 DATA F7,04,20,96,02,8D,E8,96
990 DATA 03,8D,E4,96,04,8D,E0,BE
1000 DATA 03,EF,BC,03,EB,26,03,BE
1010 DATA 03,ED,BC,03,F1,10,27,FD
1020 DATA F9,A6,80,BF,03,EF,8D,13
1030 DATA BD,01,1B,86,DF,B7,FF,02
1040 DATA B6,FF,00,84,02,10,27,FD
1050 DATA E1,20,D4,8D,3F,5F,8D,3E
1060 DATA C6,08,34,04,5F,44,59,58
1070 DATA 8D,34,35,04,5A,26,F3,8D
1080 DATA 2B,10,21,FE,B3,10,21,FE
1090 DATA AF,10,21,FE,AB,10,21,FE
1100 DATA A7,10,21,FE,A3,10,21,FE
1110 DATA 9F,10,21,FE,9B,10,21,FE
1120 DATA 97,10,21,FE,93,F6,FF,22
1130 DATA 54,25,FA,39,C6,02,F7,FF
1140 DATA 20,8D,00,9E,07,8C,9E,97
1150 DATA 7E,02,93,30,1F,26,FC,39
1160 DATA 8E,04,00,CC,60,60,ED,81
1170 DATA 8C,04,1F,25,F9,BE,03,F1
1180 DATA CC,F8,70,BC,03,EF,25,11
1190 DATA 27,15,FC,03,F1,B3,03,EF
1200 DATA 34,06,CC,F8,70,A3,E1,20
1210 DATA 06,FC,03,EF,B3,03,F1,1F
1220 DATA 01,86,46,10,8E,04,1F,B7
1230 DATA 04,00,86,45,A7,A4,86,7E
1240 DATA 8C,08,48,23,08,30,89,F7
1250 DATA B8,A7,A2,20,F3,39,8E,03
1260 DATA 24,10,8E,05,E0,17,FD,7E
1270 DATA CC,FD,08,BD,03,D7,27,0C
1280 DATA CC,BF,02,BD,03,D7,10,27
1290 DATA FD,7C,20,EC,BE,03,F1,BC
1300 DATA 03,EF,10,27,FD,70,BC,03
1310 DATA ED,26,03,BE,03,EB,A6,82
1320 DATA 81,0D,26,EB,86,20,A7,84
1330 DATA BF,03,F1,39,52,45,4D,4F
1340 DATA 56,45,20,4C,41,53,54,20
1350 DATA 43,41,52,52,49,41,47,45
1360 DATA 20,52,45,54,55,52,4E,3F
1370 DATA 20,59,2C,4E,00,BD,03,91
1380 DATA 8E,03,68,10,8E,04,E0,BD
1390 DATA 00,6E,CC,FD,08,BD,03,D7
```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

```
1400 DATA 10,27,00,2B,CC,BF,02,B
D
1410 DATA 03,D7,10,27,FC,BC,20,D
D
1420 DATA 2A,2A,2A,2A,2A,20,20,2
0
1430 DATA 41,52,45,20,59,4F,55,2
0
1440 DATA 53,55,52,45,3F,20,20,2
0
1450 DATA 20,2A,2A,2A,2A,2A,00,B
7
1460 DATA FF,DE,86,03,97,71,7E,A
0
1470 DATA 27,8E,04,00,86,60,A7,8
0
1480 DATA 8C,06,00,26,F9,39,8D,F
1
1490 DATA 30,8D,00,14,10,8E,04,E
0
1500 DATA BD,00,6E,86,0A,8E,00,0
0
1510 DATA BD,02,93,4A,26,FA,0E,2
2
1520 DATA 42,55,46,46,45,52,20,4
9
1530 DATA 53,20,46,55,4C,4C,20,2
D
1540 DATA 20,57,41,49,54,20,46,4
F
1550 DATA 52,20,4D,45,4E,55,00,B
7
1560 DATA FF,02,34,04,B6,FF,00,A
4
1570 DATA E0,39,B6,FF,21,8A,08,B
7
1580 DATA FF,21,39,FE,B0,FF,00,F
F
1590 DATA 00,FF,00,01,A8,FF,00,F
F
1600 DATA 00,FF,00,FF,00,FF,00,F
F
1610 DATA E9,00,FF,00,FF,00,FF,0
0
1620 DATA FF,00,FF,00,FF,00,FF,0
0
1630 DATA FF,00,FF,00,FF,00,FF,0
0
1640 DATA FF,00,FF,00,FF,00,FF,0
0
1650 DATA FF,00,FF,00,FF,00,FF,0
0
1660 DATA FF,00,FF,00,FF,00,FF,0
0
1670 DATA FF,00,FF,00,FF,00,FF,0
0
1680 DATA FF,00,FF,00,FF,00,FF,0
0
1690 DATA FF,00,FF,00,FF,00,FF,0
0
1700 DATA FF,00,FF,00,FF,00,FF,0
0
1710 DATA 1A,50,8E,10,00,10,8E,0
0
1720 DATA 00,A6,80,8C,14,4F,10,2
7
1730 DATA EB,9E,A7,A0,20,F3,FF,0
0
1740 DATA FF,00,FF,00,FF,00,FF,0
0
1750 DATA FF,00,FF,00,FF,00,FF,0
0
1760 DATA FF,00,FF,00,FF,00,FF,0
0
1770 DATA ED,00,FF,00,FF,00,FF,0
0
1780 DATA FF,00,FF,00,FF,00,FF,0
0
1790 DATA FF,00,FF,00,FF,00,FF,0
0
1800 DATA FF,00,FF,00,FF,00,FF,0
0
1810 DATA FF,00,FF,00,FF,00,FF,0
0
1820 DATA FF,00,FF,00,FF,00,FF,0
0
1830 DATA FF,00,FF,00,FF
```

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89 Milan Parekh, Fullerton, CA
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2,512,620	Jason Steele, Pensacola, FL
2,115,790	Jerry Honigman, Waggoner, IL
2,011,200	Jerry Colbert, Bakersfield, CA
1,108,750	Robert Fox, Dover, OH
1,081,530	Michael Wallace, Bronx, NY
1,025,900	John Hotaling, Duanesburg, NY
1,016,050	Edward Swatek, Chicago, IL
933,740	Yvan Langlois, Laval, Quebec
932,660	Brian Hunter, South Berwick, ME
787,780	Brad Wilson, Lithia Springs, GA
685,840	Karen Jessen, Cleveland, OH
456,220	Scott Jamison, Billerica, MA
410,868	Billy Helmick, Independence, KY

GATES (THE RAINBOW, 8/86)

600	★Minesh Patel, Benton, AR

HOME ROW BOMBER (THE RAINBOW, 1/87)

6,384	★Timothy Hennon, Highland, IN

JUNIOR'S REVENGE *(Computerware)*

1,500,300	★Alex Abraham, Atlanta, GA

KAMAKAZIE KAR (THE RAINBOW, 8/85)

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83.85	Dan Dawson, Fort Wayne, IN
75.75	Tim Glenn, Havertown, PA

THE KING *(Tom Mix)*

3,824,280	★Andre Grenier, Quebec, Canada

KNOCK OUT *(Diecom Products)*

181,085	★Rush Caley, Port Orchard, WA
168,385	John Licata, Richton Park, IL
151,850	Christian Grenier, Quebec, Canada
149,190	Daniel Lesage, Laval, Quebec
138,150	Nick Pettibone, St. Louis, MO

LANCER *(Spectral Associates)*

99,700	★David Kauffman, South Haven, MI

LUNCHTIME *(Novasoft)*

42,025	★Steve Place, Webster, NY

MICROBES *(Radio Shack)*

121,330	★Minesh Patel, Benton, AR
77,700	Brian Abeling, Monticello, IA

MINIGOLF (THE RAINBOW, 5/86)

23	★Wilfrid Sloan, Newport-on-Tay, Scotland
25	Billy Helmick, Independence, KY
32	Chris Banas, North West Territories, Canada

MISSION: F-16 ASSAULT *(Diecom Products)*

468,750	★Karen Jessen, Cleveland, OH
127,550	Michael Heitz, Chicago, IL
49,630	Edward Swatek, Chicago, IL
45,500	Chuck Morey, Bakersfield, CA
38,305	Richard Nieves, Mayaguez, Puerto Rico
36,800	Blake Cadmus, Reading, PA

MODULE MAN *(Spectral Associates)*

166,500	★James Church, Pointe Claire, Quebec

MUDPIES *(MichTron)*

286,600	★Chuck Morey, Bakersfield, CA

ONE-ON-ONE *(Radio Shack)*

1,204-0	★●Chad Johnson, Benton, AR
1,160-0	●Mark Lang, Downieville, CA
1,132-23	Dan Liffmann, Andover, MA
1,086-17	David Blankenship, Princeton, WV
1,078-2	Toby Jacobs, Bellefontaine, OH
1,064-16	Tim DeJong, Rock Valley, IA

OPERATION FREEDOM (THE RAINBOW, 8/85)

15,343	★Matthew Knight, Yakima, WA

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1,059,350	★David Kauffman, South Haven, MI
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10,489	★Karl Gulliford, Summerville, SC
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— Jody Doyle

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

Scoreboard:

Thanks to Maurice MacGarvey for advice on *Bedlam* (March '87). He might also be interested to know that there is an escape through one of Picasso's painted doors.

He also enquired about *Madness and the Minotaur.* `LOOK` in every pit and every pool of water. When you get to the room with the "strange colored walls," turn your lamp off and `LOOK WALLS`.

Annette Clear
San Diego, CA

Scoreboard:

In response to Ronnie Scott's letter about *Zork I* (March '87): To kill the thief, you must first give him the egg, and then kill him in the treasure room with the axe.

Any help with *Madness and the Minotaur* would be greatly appreciated.

Chris Pond
Mackinaw, IL

Scoreboard:

In response to the letter from David Solley (January '87): To find another entrance to the passage in *Blackbeard's Island*, go up the cliff and type `MOVE SIGN`. Then go in. In *Vortex Factor*, what's the number for the dial? How do you stop the water in the boat in *Dallas Quest*?

Ian Renauld
St. Eustache, Quebec

Scoreboard:

In reference to John Riddle's letter concerning *Madness and the Minotaur* (March '87): After revealing the ledge, try climbing it. The gem the packrat likes changes from game to game so try a different one.

Here are a couple of tips on the game *Zork I*: The randomly placed pit in the maze hides a treasure. To get it, first jump it and then look at it.

JoAnne Minteer
Pinellas Park, FL

Major Stumbling Block

Scoreboard:

In *Major Istar*, I think I have gotten and done everything I can before the door with radiation, but every time I step in, I die. Also, what do you do in the Casino in the *Interbank Incident*?

David Harris
Idaho Falls, ID

Quandic Quandary

Scoreboard:

I need help on Level 2 of *Preserve Quandic.*

Don Grey
Austell, GA

Beyond Level 9

Scoreboard:

Does anyone know the pokes to jump to the various levels of Novasoft's *Gold Runner*? I would like to see what comes after Level 9.

Bill White
Live Oak, FL

Please Pass the Serpent

Scoreboard:

I have had *Pyramid* for months but haven't been able to get past more than 10 rooms before I meet a serpent that will not let me pass by.

Normand Schafer
Quesnel, British Columbia

Foiled by Gargoyle

Scoreboard:

In *Raaka-Tu*, I have collected the food, the sword, the lamp, the candle, the bejeweled lever and the golden idol — but I can't get past the gargoyle. I tried lighting the candle with the lamp (quickly), but I got killed by the smoke.

Travis Stramer
Bismarck, NJ

Pool Your Resources

Scoreboard:

In *Sands of Egypt*, does the solution have something to do with the rain cover (in the pool)?

Marshall Miller
Oneonta, NY

Safe Solution

Scoreboard:

How do you open the safe in *Vortex Factor*?

Jason Thomas Wysokowski
Roselle Park, NJ

THUUDO—Befuddled

Scoreboard:

I've had a great deal of enjoyment with both RAINBOW Adventure books. Some of the games have been sources of help in my programming experiences. One Adventure has totally befuddled me, though — *THUUDO.* I get stuck right after the shovel (or pickax) is found.

Also, I've got a clue for *Wizard's Castle.* When you reach the cave that is locked and barred, type `HELP` and follow the hint given.

John Beck
Suitland, MD

Banishing Act

Scoreboard:

In *Zork I*, after you ring the bell and light the candles at the entrance to Hades, what do you do to banish the spirits? How do you open the grating in the forest?

Here's a tip for *Sands of Egypt*: Feed the camel the dates.

John C. Austin
Clifton, TX

Lost in the Woods

Scoreboard:

I have non-graphics versions of *Black Sanctum* and *Calixto Island.* In *Black*

Sanctum, all I can do is go to the cabin, explore it, leave and get lost in the woods.

In *Calixto Island*, I can get to the jungle edge, but no further.

Emilie S. Bruchon
Belmont, NC

Token Question

Scoreboard:

In *Wishbringer*, how do you keep everything from being lost when met by the spirits after escaping from the prison? Is there any way to keep from being caught by the boots? Is there a token that you can use to play the video game?

In *The Wild West*, how do you get into the hotel room where Black Bart's girlfriend is?

In *The Interbank Incident*, has anyone found where the thieves' hideout is? I have found the codebook, but no crooks.

Chad Johnson
Benton, AR

Some Key Points

Scoreboard:

A few hints for *The Interbank Incident*: The key will open the door on the train to Germany, and the door in the Louvre Museum. If you examine the mail bag on the train, you will find an invitation to a video game tournament in the guard room of the Louvre museum.

One question — How do you get both keys for the door of the apartment with the Rio poster on it?

Bill Marks
Brockport, NY

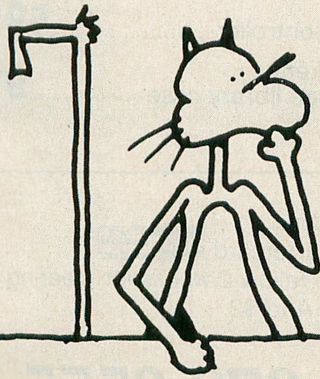
Hat Hint

Scoreboard:

In *The Interbank Incident*: To get into the military base in Seattle, either be "Mick Tarmin" or buy a military hat in Paris. The `EXAMINE` feature is useful in a few situations.

I can't get through the bronze doors or get out of the mine shaft in *Dragon Blade*. How do you use the scroll?

Robert Perdock
Centereach, NY



Golem Woes

Scoreboard:

In *Hall of the King 2*, after I reach the room with the golem in it, I can't figure out how to kill him. I got the sphere, pushed the button and dropped it, only to have it kill me. Can it be done or do you have to go through the mine entrance?

Jason Harder
E. Hartland, CT

Not Fond of Anaconda

Scoreboard:

I'm having trouble with *Dallas Quest*. When I meet up with the Anaconda, I can't do much or go anywhere with him in my way.

Noel Nelson
Aurora, CO

Wheat Defeat

Scoreboard:

I am having trouble getting through the wheat field in *Dallas Quest.*

Matthew Lohse
Camarillo, CA

CSAVE Survival

Scoreboard:

Last year I solved *Dungeons of Daggorath*, and let me tell you, it is practically impossible without a good cassette recorder and tape. When danger arrives, you can `CSAVE` it at that spot and reload it if you get killed.

Chris Nicholes
Orem, UT

Get by the Creepy-Crawlies

Scoreboard:

Here's help for *Pitfall II*: When you get the ring, fall down one ledge. Make it by the condors, bats, scorpions, and the one frog. Then go up and you shall find Quickclaw.

Stephen Erickson
E. Longmeadow, MA

Slammin' Jammin'

Scoreboard:

In *One-on-One* does anyone know how to slam the ball backwards?

Steve Beck
Ft. Jackson, SC

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

— Jody Doyle

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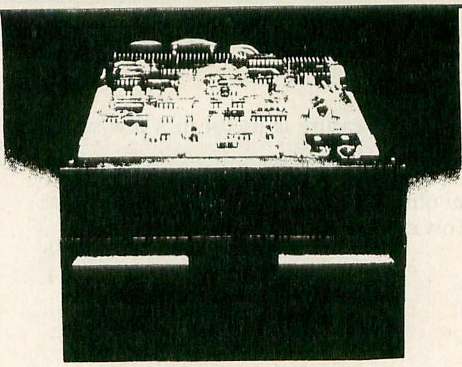

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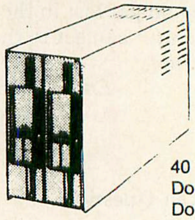

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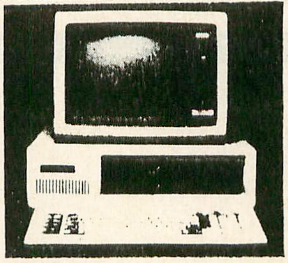

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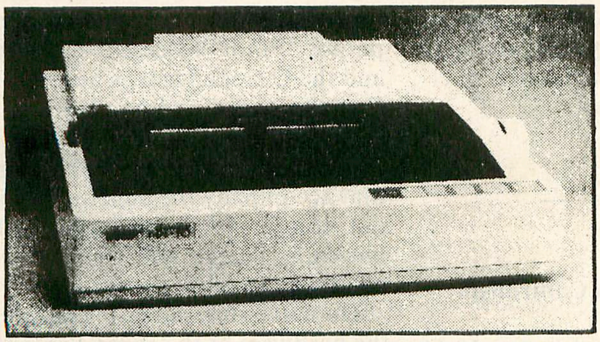

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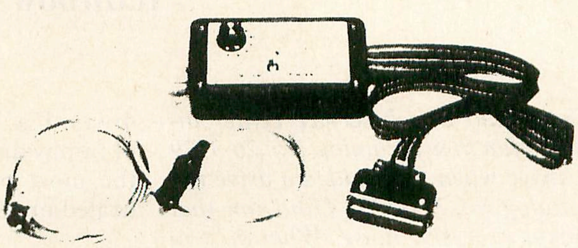

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Noisy Fan in Two-Drive System

By Marty Goodman
Rainbow Contributing Editor

The Radio Shack service center installed a fan in my Catalog No. 26-3129 disk drive when they added a drive no. 1 (Catalog No. 26-3130). I find now that it makes excessive noise. What do you recommend?

Fred J. Fratto
Downers Grove, IL

I'm rather suprised to hear that Radio Shack is using fans in their floppy disk drive systems. A well-designed linear power supply for dual floppy drives — one that has properly beefy voltage regulators mounted on properly beefy heat sinks that are positioned to allow convective cooling — should *never* need a cooling fan.

If you know a local hardware hacker, consider arranging to have the power supply for the drives rebuilt with an externally mounted massive heat sink and TO-3-style case voltage regulators, or at least a TO-3-style regulator on the 12-volt supply line (or two TO-220-style case 12-volt regulators — one for each drive). I've both built and seen dozens of floppy disk power supplies, and only the most badly designed ones overheated or required a fan.

Proper Fix for CoCo Controllers

I'm having trouble with my J&M brand controller when using it with my CoCo 3. Can you help?

Matt Hazard
Columbia, OH

In a previous "CoCo Consultations," I advised folks (based on word from J&M systems) that old JFD CoCo controllers could be fixed to work with the CoCo 3 by replacing a 74LS04 chip with a 7404 chip. But more recently, J&M told me that this fix is not proper and will not always work. The last time I spoke to them, they were fixing JFD CoCo controllers that had problems working with the CoCo 3 by substituting the Q clock signal for the E clock signal from the CoCo system bus.

J&M provides a detailed description of exactly how to make the needed modifications in a technical bulletin dated January 5, 1987. Their bulletin takes you step by step through this modification (soldering skill and a solder sucker are required). The bulletin is marred by one mildly confusing typographical error: They use the phrase "Pin 6" to describe both the E and the Q clock lands, when in fact the E clock is on Land number 6 and the Q clock is to be found on Land number 7. But this is made clear in the diagrams that accompany the bulletin. If you are not comfortable with such hardware hacking, I urge you to return your controller to J&M for repair.

Do make sure the problems are with the hardware of the controller, and not with the Disk ROM in it. For example, JDOS will not work properly with the CoCo 3. You need to have either unmodified Radio Shack Disk BASIC, or use ADOS 3, a set of patches for Disk BASIC specifically made by Spectrosystems to work with the CoCo 3.

GIME Advice on the Horizontal Scroll

I've been having problems designing programs that use the horizontal scroll register ($FF9F) of the GIME chip in the CoCo 3. Often they crash without apparent reason. Do you know of others who have this problem, and what its cause is?

Bob Lentz
La Jolla, CA

Thanks very much for alerting me to this matter. I asked around and found

---

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. Marty is the database manager of RAINBOW's CoCo and OS-9 Online SIGs on Delphi. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

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All programs run on the CoCo I, II and III, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for postage and handling. Florida residents add 5% sales tax. COD orders add $4. Dealer inquiries invited.

that in most CoCo 3s owned by my friends, the horizontal scroll appears to have a serious problem. I have reason to believe that an inexpensive fix will eventually be available from Tandy. For now I recommend to software developers that they not use the horizontal scroll features of the GIME. At least, not until the required fix is announced officially by Tandy, which should be within a couple of months. Look for further word on this in RAINBOW.

> ***"The CoCo is a remarkably rugged and reliable computer, and it should be able to withstand being on continuously, for a very long time."***

Slot Select Switch

Why can't I switch my Multi-Pak from Slot 4 (disk drive) to Slot 3 (R/S Speech/Sound Pak) under program control?

Johnathon S. Beal
Addison, ME

The Sound/Speech Program Pak from Radio Shack has its addresses fully decoded via the address bus. Access to its ports is unaffected by the slot select switch (either the hardware or the software select switch). Because the interrupt handling routine of CoCo BASIC uses the Disk ROM (which *is* selected via the Multi-Pak selector switch), changing the slot selection (using either the slot selector switch or the software switch at $FF7F) while in Disk BASIC will usually cause the system to crash, though occasionally it will recover and reboot in Extended BASIC.

To use the Sound/Speech cartridge from Disk BASIC, just keep the slot selector pointing at the disk controller cartridge. You need to carefully study the documentation that comes with the Sound/Speech Pak and learn about its ports and how they function.

Monitor Adapter for CoCo 3

I have an RGB-capable monitor (JVC TM 90PSN), but its inputs are of the RGB TTL (digital) variety only. No provisions for analog RGB input are present. Can I use this with my CoCo 3?

Alexandre Maggiain
Lausanne, Switzerland

If you want to get all 64 of the CoCo 3's colors visible on your TTL RGB (sometimes called RGB I in IBM circles) capable monitor, the answer to your question is that it is impossible to use the monitor you describe with the CoCo 3 without some delicate custom modifications to its circuit. There is a commercial device just introduced by J&M systems that may be of some help to you. This device plugs in to the CoCo 3's RGB connector and conditions the signal so that it can drive IBM-type RGB TTL monitors. The catch is that this system will only let you get six colors and black and white on such a monitor. Thus, this commercial adapter is of little use to those who want to use the many-colored graphics capabilities of the CoCo 3. However, the adapters are of considerable value to those who have an IBM-type RGB TTL monitor and want to use it for display of 80-column color text using their CoCo 3.

I have viewed this adapter hooked to a TTL RGB monitor and a CoCo 3, and can report it worked very nicely. This adapter also has a jumper that is supposed to allow it to drive an IBM TTL type monochrome monitor. I personally did not get a chance to evaluate this option; however, the folks at J&M told me that, in such a mode, the image on the TTL IBM monochrome monitor does not quite fill the screen, but is readable. The adapter sells for $35 from J&M systems (see their ad in this issue of RAINBOW for their address).

Color Computer Burn Out?

I want to leave my CoCo 2 on for 24 hours a day running DeskMate. *Will this burn it out?*

James Mc Dowell
Wilmington, DE

The CoCo is a remarkably rugged and reliable computer, and it should be able to withstand being on continuously, for a very long time. I have friends who use their systems this way, both to run bulletin board systems and to keep the power on in their 512K RAM disk cards. In general, their systems have survived quite well. Do note, however, that if your computer has any slight flaws in its power supply (particularly any tendency to overheat, which sometimes does plague CoCos) running it 24 hours a day will accentuate such flaws and possibly cause the machine to fail. Also, in theory, such use of the machine might somewhat decrease its overall life.

Four-Drive Systems

I have four TEC half-height drives, but can't seem to get Drive 3 (the fourth drive in the system) to operate. Can you help?

John Kenziora
(WIRES)
Whitehouse, OH

I once built several four-drive systems using TEC 501 half-height, single-sided drives, for use by a couple of major CoCo software publishers as mass disk production systems. The problem you face is common to all four-drive CoCo systems not made by Tandy. Tandy uses Pin 32 as the select line for Drive 3 on its disk controller. But most drives use Trace Number 6 as the Drive 3 select line.

On the drive you are using as Drive 3, you must cut Land 32 where it becomes a PC board trace and jumper the incoming signal that goes to that land over to Land 6 on the drive. Finally, you must also jumper a source of +5 volts to the trace that used to be fed by Land 32. You see, Land 32 is the side select line on most drives. And even on single-sided drives, circuitry is present for side selection. So if the trace that was fed by Land 32 is not pulled high, your drive may occasionally "float" between access of its (existing) Side 0 and of its (non-existent) Side 1. This would be disastrous! Note also that I am assuming you have single-sided drives, because the CoCo's disk controller is not equipped to access more than three physical double-sided drives.

Speeding Up the DMP-200

I am using a DMP-200 printer at 1200 baud via the bit-banger port and find it hideously slow. How can I speed matters up? Will a parallel interface help?

Paul J. Burke
(PJB)
Palmdale, CA

The DMP-200 printer is slow due to an unfortunate design: It first fills its line buffer, then prints the line in question. While it is printing, it is busy and cannot accept further data. When it finishes printing the line, it opens its buffer and waits until the whole next line has been received. This, of course, takes significant time when the data is being sent at 1200 baud. The result is what you observe — the printer twiddling its thumbs after printing each line.

If you fed it via a parallel port (such as the one provided on a J&M Disk Controller) it would fill its line buffer a great deal faster than it does with 1200 baud serial data transfer, and thus the waits between lines would be minimized. But unless you are using OS-9, you may find that many applications programs cannot access the printer via an add-on parallel port.

An alternative solution is to get a serial-to-parallel buffer/converter. I have seen old Microfazer units of this sort, with a 64K buffer, selling at swap meets here for as little as $50. This approach would preserve use of the standard bit-banger port, but would allow you to blast data into the buffer at 9600 baud and serve it up to the DMP-200 via its parallel port, allowing it to print as fast as it is capable of doing.

Bit-Banger Cables

When hooking a printer to the CoCo bit-banger port, can you remind me what line is used for handshaking, and why?

Rick Adams
(RICKADAMS)
Rohnert Park, CA

Though some find it surprising, the CoCo (under BASIC and under most application programs I have seen) uses the Data In Line (Pin 2 of the DIN connector) as the printer busy detect line. You might have expected them to use the Carrier Detect (Pin 1) Line for this. But the Carrier Detect Line on the CoCo's bit-banger port is hooked internally to that weird CA1 pin on the PIA. Because of this, the Carrier Detect Line can only be used to detect a *change* in the status of the signal it sees. As you know, the CA1 line is totally unable to detect the actual state of its input (high versus low). This makes it a lot less convenient to use.

Now, in sending data to the printer, you never need to use the Data In Line to receive RS-232 serial data from the printer, so that Data In Line is free for use as a handshake signal detect line. It seems Tandy or Motorola ran out of available "normal" data port pins on the PIA when it came to finding a line for the carrier detect and so was forced to use the CA1 line of the PIA. The end result of all this is that CoCo bit-banger printer cables are fundamentally different in the way they are wired from CoCo bit-banger modem cables.

Normally, on the printer side, the CoCo Pin 2 is connected to the printer's Pin 20 of its DB 25 connector. Typically, Pin 20 (DTR) is used by most printers or parallel-to-serial converters as the handshake line. Do note that on some printers you must select Pin 20 as the handshake line via DIP switches, and on some you must even tell the printer (using other DIP switches) whether to use a high or low signal to tell the computer that the printer is busy. (The CoCo under BASIC wants you to use a *low* signal to tell it that the printer is busy.)

Finally, note that the CoCo 3 has a curious addition to its circuit for the Data In Line. That line is pulled high internally by an R66, a 7.5K-ohm resistor. The effect is, if nothing is hooked to that line, it will see a "high," and data will be sent out (into the air, if nothing is hooked up). Recall how this is different from the behavior of the CoCo 1 and 2, which lack this pull-up resistor. On those machines, if nothing was hooked to the port, the computer would hang if you tried to print anything via BASIC, waiting for the Data In Line to register a high (printer not busy) signal.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

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Pretty Little Listings, All in a Row

By George Quellhorst

The idea for *Two Column Lister* originated with an article in the May 1985 issue by Mr. Stehan Lai called `2-COLUMN`. All that remains of the original program are lines 49 to 52.

Although this program was specifically written to be used with a DMP-130 printer, changing it for use with other printers is simple. All the printer codes are contained in a "printer-code select" `GOSUB` that lets you select from eight different character styles for printing your newly generated printout (lines 94-101). By changing the printer codes in these lines, printer compatibility does not present any particular problems.

Two Column Lister generates both 32- and 40-wide two-column listings, and some of its other features make this a very user-friendly utility. The capability to save a newly generated listing to disk comes in very handy, especially when more than one listing is needed. Also included is an automatic page-numbering system that lets you set the value of the first page number of the listing. A rather annoying bug, that printed a line filled with spaces whenever the line preceeding it was exactly 32 characters long, has been exterminated.

You may need to make one or two changes in Line 1. If you do not have a CM-8 or some other RGB monitor, change the command `PALETTERGB` to `PALETTECMP`. The `POKE150,18` sets the baud rate of the Color Computer to 2400. The baud rate is the speed at which CoCo 3 sends its information to the printer. If your printer cannot handle this speed, change it to `POKE150,41` for 1200 or to `POKE150,87` for a baud rate of 600. The baud rate does not affect the speed at which the printer does its printing. A higher or lower baud rate shortens or lenghtens the time your printer needs to fill its buffer. The only time you actually save is in the shorter intervals between the printing of each line.

Because the designers of the Color Computer 3's ROM left the cursor on the Hi-Res screen while the computer's executing a program, I had two options while writing this program. I could either have cursors flashing all over the screen while the listing was being loaded into memory, or I could put an `ATTR 1, 0` and a `LOCATE` command after each `PRINT` statement, in order to make the cursor invisible. I chose the latter; although the big drawback is that whenever an error occurs while the computer is in the `ATTR1, 0` mode, you'll end up with an empty screen and absolutely no idea what sort of error occurred where. In the future, when writing a program for the CoCo 3, I am going to put the values in this `ATTR` command into variables, thereby eliminating the blind search for an error and the need to change all the `ATTR` commands. What we need here is a new ROM, without fancy pictures embedded in it, and a cursor that knows how to behave itself. The syntax for a `PRINT` statement without a cursor printed behind it is `LOCATE 8, 4:ATTR3,2:PRINT"HELLO";:ATTR1, 0:LOCATE18,6`. Please note the sequence:

1) `LOCATE` the cursor.
2) The `ATTR` for your print statement.
3) Make your `PRINT` statement.
4) Set foreground and background to the same color (`ATTR1,0`)
5) `LOCATE` cursor at the next print location.

Because of all this, I have designed a rather elaborate input section, making it almost impossible to get any kind of error that would halt the execution of the program. In the words of my son, "It is almost, but not quite, idiot-proof."

The program is divided into three parts. First comes input section, followed by the actual listing generator (coupled with an output section that will write the generated listing either to your printer or disk). The last part retrieves a previously generated listing, writing it directly to the printer one page at a time.

A word of caution before we take a look at the program. If you type in the listing, pay close attention to the number of spaces needed in lines 70 and 71. Those spaces center the listings on your paper when they are printed and formats them before they are saved.

Starting with the main menu, the first item we will look at is the creation of a two-column listing. The program you are going to `LLIST` has to be saved in ASCII code on your disk. Seven pieces of information are required before a new listing can be generated. First, of course, is the filename of the listing. The extention has to be ".BAS." The error-trapping routine will not allow you to enter a filename longer than eight characters. It also won't accept the name of a file that does not exist on your disk, or any file that does not have ".BAS" as an extention. Neither will it accept a `CHR$(13)`, ENTER. All this is accomplished in lines 16 to 18. Line 16 is a `LINEINPUT`, which adds ".BAS" to your input. It then checks to see if `DN$=".BAS"`. If it does, it means you pressed ENTER only, and the program

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George Quellhorst lives in Painesville, Ohio, and has had a CoCo since the 4K days. He enjoys writing programs on his two CoCo 2s and a CoCo 3 with RGB monitor.

goes right back to 16. Line 17 checks the length of the filename including the extension. If it's greater than 12, it does a `GOSUB 82`, which erases the message on the bottom of your screen. After returning, it does a `GOSUB 84`, and the new message will let you know that a filename cannot exceed eight characters. The `LOCATE 21,3:PRINT""` erases the filename you typed and returns to Line 16. The program to be listed is treated as a direct access file in which each entry is one character long. Line 18 opens your file `DN$` and checks the length of the file. If the length of the file, `LOF(1)`, is zero, the file was not on your disk and was just now opened. The program kills the just opened file, tells you that the file does not exist and routes itself back to 16. If you enter a valid filename, the program opens the file and prints the message ".BAS OPEN" behind the filename you have just entered (Line 18).

Each time an input is required, the program prints a message on the bottom of the screen to let you know the requirements and limitations of that particular entry. Since we went through the error-trapping routine for the first input statement, I won't go through the rest of them step by step; all are written in a similar fashion.

Each time the computer prompts for an input, you will notice a flashing left arrow on a blue background. This is the limit cursor. You must press ENTER on or before this cursor. For example, a filename will be exactly eight characters long if you pressed ENTER on top of this cursor.

The next input is the listing title. If no title is desired, press ENTER. The message "no header" will appear. The filename for your two-column listing is the next entry. Even if you are not planning to save the listing to disk, which you signify by pressing ENTER, *Two-Column Lister* still opens a file for the listing. Line 27 takes care of it by naming the file `N/DAT` and printing the message "printer." As soon as the listing is printed, this file is killed.

I have provided an input for first page number in case your listing follows documentation for a program, or to cover any situation where you might not want the first page number to be number one. To start with one, press ENTER.

If you pressed enter at the Filename prompt, the program skips the Disk or Printer prompt and displays "printer." Otherwise, press D for disk or P for printer.

The last two inputs are important. They determine how the listing is formatted before it is generated. A listing formatted to be 40 columns wide, and then saved as such, has to be printed later on in exactly the same way. The same holds true for the character width of 10 or 12 cpi. Check out the lines 71 to 72 where `CO=(8*CPI)` and `W` is the column width. The listing can be formatted three ways. It is impossible to list a 40 character wide two-column listing at 10 cpi since that would print only a total of 80 characters per line. The error-trapping routines check for that mistake.

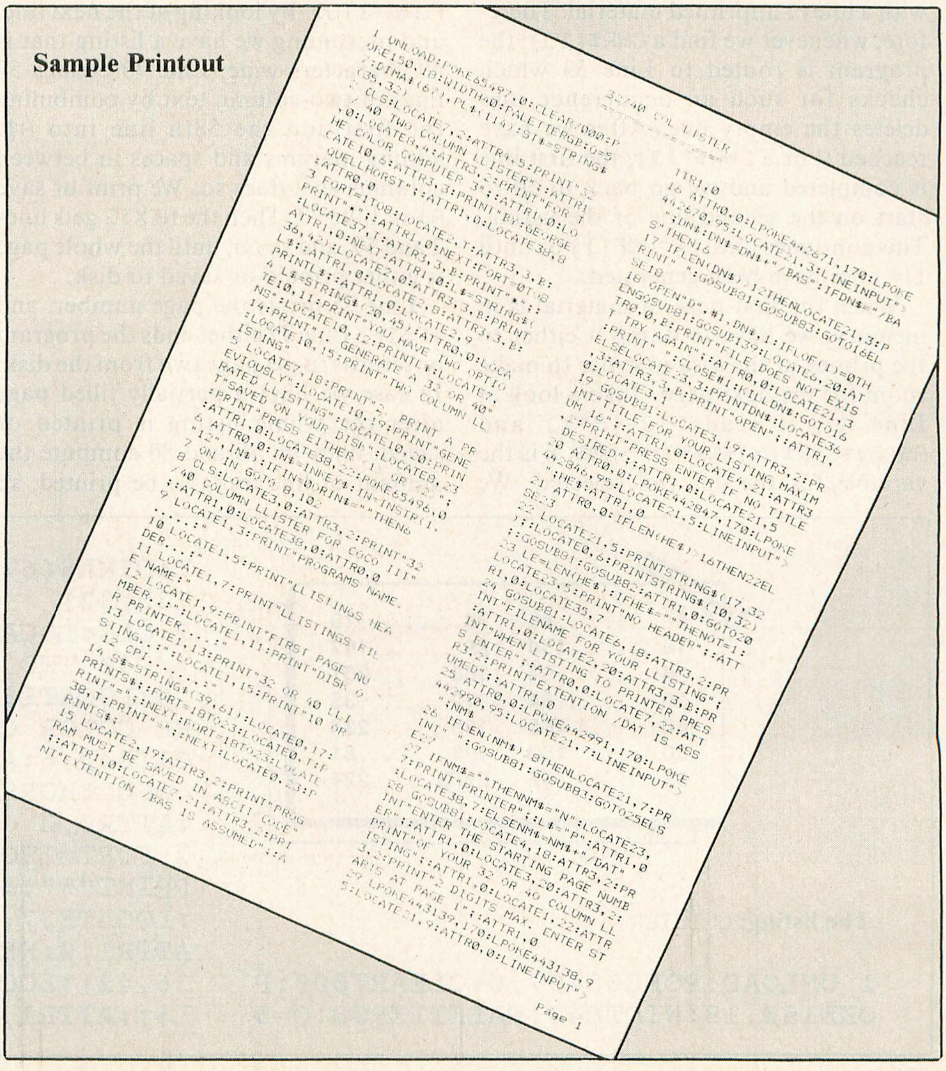
If you are sending the listing directly to the printer, the next order of business is the selection of the character style you want. With a listing that is 32 columns wide, you may select one of the eight styles. In a 40-column listing, you are restricted to the last four (12 cpi). The program will not allow you to select a 10 cpi width when you're formatting a 40-column listing. It gives a warning and waits for another input. When selecting printer codes, the printer has to be on; printer codes are sent directly to the printer. If your printer is off, the program will hang up until you turn it on.

Generating the Llisting

This is accomplished in Line 44 and lines 49 through 58. Line 44 opens a second file to accept the new listing, which will be stored in memory until it is either dumped to the printer or saved on disk. File one, the original listing saved in ASCII code, was opened in Line 18.

In order to count the number of characters for each line, we are going to treat the original listing as though it was saved to the disk as a direct access file, with each entry being one character long. The first thing we must do is make sure there is no previous information left in the computer's memory to interfere with our listing. Since we want to end up with 114 lines of text, we start a `FOR-NEXT` loop to contain the entire first page and make each line equal `BL$`, which was defined in Line 44 as `W` (our line width) number of spaces.

Line 50 opens a second `FOR-NEXT` loop for each line. `CN` keeps a running


Sample Printout

count of all characters, including *spaces,* taken from the disk. The variable LF equals LOF(1). Therefore, IF CN>LF, the end of our file has been reached. ST is a flag, which we will use later to let the computer know all the information has been retrieved from the disk. Line 51 gets the first character, RD$, from the disk and checks to see if it's a CHR$(13) which, since you press ENTER after typing in each program line, indicates that the end of a program line has been reached. Presuming our character is not a CHR$(13), Line 51 takes the first empty space in PL$(F), our first line, and replaces it with RD$. The next F1 gets the second character and so on, until either a CHR$(13) is found or W is reached. Since we are replacing spaces in an existing line, it does not matter if the line is only nine characters long; the remaining spaces fill out the rest, and the length of the line will always equal W.

Since a program line exactly 32 or 40 characters long is really 33 or 41 characters long because of the CHR$(13) on the end, the program would put the CHR$(13) on the next line, leaving you with a line of unprinted material. Therefore, whenever we find a CHR$(13), the program is routed to Line 53 which checks for such an occurrence and deletes the empty line. After we have reached W or a CHR$(13), the first line is completed and we go back to 50 to start on the second line of the listing. This continues until CN=LOF(1) or until 114 lines have been generated.

When the first page of material is in memory, we have to dump it either to the printer or the disk in order to make room for the next page. Take a look at Line 41; it reads CO=(8*X) and A$(0)=STR$(X)+W$+"*"+NM$. X is the variable for the cpi you selected. We have multiplied X by 8 to give us the total characters for each line, took the name of our new listing (NM$), the width of our listing (W$), and we have placed the whole thing into a new variable called A$(0). The * is being used for later reconstitution of the original variables with the use of an INSTR command. If you have decided to list directly to the printer, A$(0) will not be used. However, when you are saving the listing to your disk, A$(0) will be the first thing that is placed on your disk. It will be retrieved whenever you are printing a saved listing from the disk to inform you what kind of listing you are dealing with.

We now have 114 lines of text in memory, each line either 32 or 40 characters wide. In order to format this for printing or saving, we must first determine if we indeed have 114 lines. It may have been a very short listing, or it may be the last page of a longer listing. We do this in Line 65. First, we determine if F, the number of program lines, is smaller than 114. If so, and if ST=1, F is divided by two to set the value of Q. Line 69 opens a FOR-NEXT loop: FORG=1TOQ. By looking at the next line, and presuming we have a listing that is 40 characters wide, Line 70 creates 57 lines of two-column text by combining the first and the 58th line into A$, adding margins and spaces in between columns as it does so. We print or save A$ in Line 72. Then the NEXTG gets lines 2 and 59, and so on, until the whole page is either printed or saved to disk.

Line 75 prints the page number, and IFST=1 Line 77 either ends the program or returns to get page two from the disk. In case we have a partially filled page after the whole listing is printed or saved, lines 74, 78 and 80 compute the amount of line feeds to be printed, so that we are able to print the page number in the correct position. A line of 40 asterisks will be printed underneath the listing by Line 79.

Printing A Saved Llisting

This is a straightforward program. After you press the number two on the main menu, a directory of your disk appears. After entering the filename, the computer gets the first page of the listing from the disk and prints the name of your program, the character width and the width, either 32 or 40, of your listing on the screen and prompts you to make a character style selection. Again, the error-trapping routines will not allow you to make an error when you're in the process of selecting the printer codes.

The program will retrieve your listing from the disk one page at a time, print the page, erase memory and return to get the next page. You have the option to have the computer wait for your command before it prints the second page or to print the entire listing at once. There is really no reason to have the computer stop between sheets, because it will skip the perforations and produce a listing centered on your paper. However, the option is there.

Last, but not least, the computer keeps you informed as to what is going on, by printing little messages on the screen. For example, "now loading page one" or "now printing page one." As a result, you will find *Two-Column Lister* a very user-friendly piece of software that is simple to use.

(Questions about this program may be directed to Mr. Quellhorst at 1572 Mentor Ave., Painesville, OH 44077; 216-352-2977. Please enclose an SASE for a reply when writing.) ☐

6	86	78	19
16	154	89	162
24	94	100	201
30	84	112	35
40	168	125	234
50	152	133	81
65	162	END	224

The listing: LLISTER

```
1 UNLOAD:POKE65497,0:CLEAR7000:P
OKE150,18:WIDTH40:PALETTERGB:Q=5
7:DIMA$(67),PL$(114):ST$=STRING$
(35,32)
2 CLS:LOCATE7,2:ATTR4,5:PRINT"32
 / 40 TWO COLUMN LLISTER";:ATTR1
,0:LOCATE8,4:ATTR3,2:PRINT"FOR T
HE COLOR COMPUTER 3";:ATTR1,0:LO
CATE10,6:ATTR3,3:PRINT"BY:GEORGE
 QUELLHORST";:ATTR1,0:LOCATE38,8
:ATTR0,0
3 FORT=1TO8:LOCATE2,T:ATTR3,3,B:
PRINT"*";:ATTR1,0:NEXT:FORT=0TO8
:LOCATE37,T:ATTR3,3,B:PRINT"*";:
ATTR1,0:NEXT:ATTR1,0:L$=STRING$(
36,42):LOCATE2,0:ATTR3,3,B:PRINT
L$;:ATTR1,0:LOCATE2,8:ATTR3,3,B:
```

```
PRINTL$;:ATTR1,0:LOCATE2,9
4 L$=STRING$(20,45):ATTR0,0:LOCA
TE10,11:PRINT"YOU HAVE TWO OPTIO
NS":LOCATE10,12:PRINTL$:LOCATE7,
14:PRINT"1. GENERATE A 32 OR 40"
:LOCATE10,15:PRINT"TWO COLUMN LL
ISTING"
5 LOCATE7,18:PRINT"2. PRINT A PR
EVIOUSLY":LOCATE10,19:PRINT"GENE
RATED LLISTING":LOCATE10,20:PRIN
T"SAVED ON YOUR DISK":LOCATE8,23
:PRINT"PRESS EITHER <1> OR <2>";
:ATTR1,0:LOCATE38,22:POKE65496,0
6 ATTR0,0:IN$=INKEY$:IN=INSTR(1,
"12",IN$):IFIN=0ORIN$=""THEN6
7 ON IN GOTO 8,102
8 CLS:LOCATE3,0:ATTR3,2:PRINT"32
/40 COLUMN LLISTER FOR COCO III"
;:ATTR1,0:LOCATE38,0:ATTR0,0
9 LOCATE1,3:PRINT"PROGRAMS NAME.
.....:"
10 LOCATE1,5:PRINT"LLISTINGS HEA
DER...:"
11 LOCATE1,7:PRINT"LLISTINGS FIL
E NAME:"
12 LOCATE1,9:PRINT"FIRST PAGE NU
MBER..:":LOCATE1,11:PRINT"DISK O
R PRINTER....:"
13 LOCATE1,13:PRINT"32 OR 40 LLI
STING..:":LOCATE1,15:PRINT"10 OR
 12 CPI......:"
14 S$=STRING$(39,61):LOCATE0,17:
PRINTS$;:FORT=18TO23:LOCATE0,T:P
RINT"=";:NEXT:FORT=18TO23:LOCATE
38,T:PRINT"=";:NEXT:LOCATE0,23:P
RINTS$;
15 LOCATE2,19:ATTR3,2:PRINT"PROG
RAM MUST BE SAVED IN ASCII CODE"
;:ATTR1,0:LOCATE7,21:ATTR3,2:PRI
NT"EXTENTION /BAS IS ASSUMED";:A
TTR1,0
16 ATTR0,0:LPOKE442671,170:LPOKE
442670,95:LOCATE21,3:LINEINPUT">
 ";DN$:DN$=DN$+"/BAS":IFDN$="/BA
S"THEN16
17 IFLEN(DN$)>12THENLOCATE21,3:P
RINT" ":GOSUB81:GOSUB83:GOTO16EL
SE18
18 OPEN"D",#1,DN$,1:IFLOF(1)=0TH
ENGOSUB81:GOSUB139:LOCATE6,20:AT
TR0,0,B:PRINT"FILE DOES NOT EXIS
T TRY AGAIN";:ATTR0,0:LOCATE21,3
:PRINT" ":CLOSE#1:KILLDN$:GOTO16
ELSELOCATE23,3:PRINTDN$:LOCATE36
```

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```
,3:ATTR3,3,B:PRINT"OPEN";:ATTR1,
0:LOCATE3,1
19 GOSUB81:LOCATE3,19:ATTR3,2:PR
INT"TITLE FOR YOUR LISTING MAXIM
UM 16";:ATTR1,0:LOCATE4,21:ATTR3
,2:PRINT"PRESS ENTER IF NO TITLE
 DESIRED";:ATTR1,0:LOCATE21,5
20 ATTR0,0:LPOKE442847,170:LPOKE
442846,95:LOCATE21,5:LINEINPUT">
 ";HE$:ATTR1,0
21 ATTR0,0:IFLEN(HE$)>16THEN22EL
SE23
22 LOCATE21,5:PRINTSTRING$(17,32
);:LOCATE0,6:PRINTSTRING$(10,32)
;:GOSUB81:GOSUB82:ATTR1,0:GOTO20
23 LE=LEN(HE$):IFHE$=""THENOT=1:
LOCATE23,5:PRINT"NO HEADER";:ATT
R1,0:LOCATE35,7
24 GOSUB81:LOCATE6,18:ATTR3,2:PR
INT"FILENAME FOR YOUR LLISTING";
:ATTR1,0:LOCATE2,20:ATTR3,3,B:PR
INT"WHEN LISTING TO PRINTER PRES
S ENTER";:ATTR0,0:LOCATE7,22:ATT
R3,2:PRINT"EXTENTION /DAT IS ASS
UMED";:ATTR1,0
25 ATTR0,0:LPOKE442991,170:LPOKE
442990,95:LOCATE21,7:LINEINPUT">
 ";NM$
26 IFLEN(NM$)>8THENLOCATE21,7:PR
INT" ":GOSUB81:GOSUB83:GOTO25ELS
E27
27 IFNM$=""THENNM$="N":LOCATE23,
7:PRINT"PRINTER";:L$="P":ATTR1,0
:LOCATE38,7:ELSENM$=NM$+"/DAT"
28 GOSUB81:LOCATE4,18:ATTR3,2:PR
INT"ENTER THE STARTING PAGE NUMB
ER";:ATTR1,0:LOCATE3,20:ATTR3,2:
PRINT"OF YOUR 32 OR 40 COLUMN LL
ISTING";:ATTR1,0:LOCATE1,22:ATTR
3,2:PRINT"2 DIGITS MAX. ENTER ST
ARTS AT PAGE 1";:ATTR1,0
29 LPOKE443139,170:LPOKE443138,9
5:LOCATE21,9:ATTR0,0:LINEINPUT">
 ";PG$:IFPG$=""THENPG$="1":LOCAT
E23,9:PRINT"1"
30 IFLEN(PG$)>3THENLOCATE21,9:PR
INT" ":GOSUB81:GOSUB82:GOTO29ELS
EPG=VAL(PG$)
31 IFL$="P"THENU=-2:LOCATE21,11:
PRINT"> PRINTER";:GOTO34ELSEGOSU
B81:LOCATE10,19:ATTR3,2:PRINT"EN
TER <D> FOR DISK";:ATTR1,0:LOCAT
E9,21:ATTR3,2:PRINT"ENTER <P> FO
R PRINTER";:ATTR1,0
32 LPOKE443297,170:LPOKE443296,9
5:LOCATE21,11:ATTR0,0:LINEINPUT"
> ";L$:IFL$=""THEN32
33 A1=INSTR(1,"PD",L$):IFA1=1THE
NU=-2ELSEIFA1=2THENU=2ELSEGOSUB1
39:LOCATE21,11:PRINT" ":GOTO32
34 GOSUB81:LOCATE13,20:ATTR3,2:P
RINT"ENTER 32 OR 40";:ATTR1,0
35 LPOKE443459,170:LPOKE443458,9
5:LOCATE21,13:ATTR0,0:LINEINPUT"
> ";W$
36 W=VAL(W$):IFW=32ORW=40THEN37E
LSEGOSUB139:LOCATE21,13:ATTR0,0:
PRINT" ":GOTO35
37 GOSUB81:LOCATE14,18:ATTR3,2:P
RINT"PLEASE NOTE";:ATTR1,0:LOCAT
E5,20:ATTR3,2:PRINT"40 COLUMNS C
AN ONLY BE LISTED";:ATTR1,0:LOCA
TE9,22:ATTR3,2:PRINT"IN THE 12 C
.P.I. MODE";:ATTR1,0
38 LPOKE443619,170:LPOKE443618,9
5:LOCATE21,15:ATTR0,0:LINEINPUT"
> ";X$:X=VAL(X$)
39 IFX=10ORX=12THEN40ELSEGOSUB13
9:LOCATE21,15:PRINT" ":GOTO38
40 IFW=40ANDX=10THENGOSUB139:LOC
ATE21,15:PRINT" ":GOTO38
41 AL=0:CN=1:CO=(8*X):PN=INT((CO
-LE)/2):A$(0)=STR$(X)+W$+"*"+NM$
42 CLS:IF L$="P"THEN GOSUB84
43 CLS:LOCATE10,6:PRINT"INSERT P
ROGRAM DISK":LOCATE12,8:PRINT"AN
D PRESS ENTER":LOCATE18,10:LINEI
NPUT">";A$
44 BL$=STRING$(W,32):OPEN "O",#2
,NM$
45 FIELD#1,1 AS RD$:LF=LOF(1)
46 CLS:LOCATE9,1:ATTR3,2,B:PRINT
"N O W   L O A D I N G";:ATTR0,
0:LOCATE8,4:PRINT"LOADING WILL B
E FINISHED":LOCATE7,6:PRINT"BEFO
RE THIS NUMBER REACHES":LOCATE17
,9:PRINT"< 114 >":ATTR1,0:LOCATE
38,9
47 PG$=STR$(PG):IFVAL(PG$)<10THE
NPG$="00"+RIGHT$(PG$,1)ELSEPG$="
0"+RIGHT$(PG$,2)
48 LOCATE10,16:ATTR0,0:PRINT"NOW
 LOADING PAGE NUMBER":LOCATE17,1
9:PRINT"< ";PG$;:LOCATE23,19:PRI
NT">":ATTR1,0:LOCATE38,9
49 FORF=1TO114:PL$(F)=BL$
50 FORF1=1TOW:CN=CN+1:IFCN>=LF T
HENST=1:GOTO58
51 GET#1,CN:IFRD$=CHR$(13)THEN53
52 MID$(PL$(F),F1,1)=RD$:NEXTF1
53 IF PL$(F)<>STRING$(W,32)ANDPL
$(F-1)=STRING$(W,32)THENPL$(F-1)
=PL$(F):PL$(F)=BL$:CN=CN-INSTR(1
,PL$(F-1),CHR$(13)):GOTO50
54 F$=STR$(F):F$=RIGHT$(F$,LEN(F
$)-1):IFVAL(F$)<10THENF$="0"+RIG
```

```
HT$(F$,1)
55 IFVAL(F$)<100THENF$="0"+RIGHT
$(F$,2)
56 ATTR0,0:A$=LEFT$(F$,1):B$=MID
$(F$,2,1):C$=RIGHT$(F$,1)
57 S=443362:LPOKES,60:LPOKE(S+4)
,ASC(A$):LPOKE(S+6),ASC(B$):LPOK
E(S+8),ASC(C$):LPOKE(S+12),62:NE
XTF
58 CLS:GOSUB61
59 IFST=1THEN101
60 OT=1:GOTO 46
61 CLS:IFU=-2THENLOCATE7,6:ATTR0
,0:PRINT"POSITION PAPER IN PRINT
ER":LOCATE11,8:PRINT"AND PRESS <
ENTER>":GOSUB139:LOCATE18,10:LIN
EINPUT">";I$
62 IFAL=0 ANDU=2 THEN PRINT#2,A$
(0) ELSE IF U=2 THEN PRINT#2
63 IF OT=1 THENFORT=1TO5:PRINT#U
:NEXT:GOTO65
64 FORT=1TO2:PRINT#U:NEXT:PRINT#
U,STRING$(PN,32)+HE$:PRINT#U,STR
ING$(PN,32)+STRING$(LE,61):PRINT
#U
65 IFF<114ANDST=1THENQ=INT(((F)/
2)+.5):Z=1
66 IFL$="D" OR U=2 THEN 68
67 CLS:LOCATE14,10:ATTR3,2,B:PRI
NT"NOW PRINTING";:ATTR1,0:LOCATE
35,10:ATTR0,0:GOTO69
68 CLS:LOCATE11,10:ATTR3,2,B:PRI
NT"NOW SAVING TO DISK";:ATTR1,0:
LOCATE35,10:ATTR0,0
69 FORG=1TOQ
70 IFW=40THENA$="    "+PL$(G)+"
      "+PL$(G+Q):GOTO72
71 IF CO=96 THEN A$="          "
+PL$(G)+"           "+PL$(G+Q) E
LSE IF CO=80 THEN A$="    "+PL$(
G)+"       "+PL$(G+Q)
72 PRINT#U,A$:NEXTG
73 PRINT#U
74 IF Z=1 THEN 78
75 IF CO=80 THEN PRINT#U,STRING$
(70,32);:PRINT#U,"Page";PG ELSE
IF CO=96 THEN PRINT#U,STRING$(86
,32);:PRINT#U,"Page";PG
76 PRINT#U:PRINT#U
77 IFST=1THEN101ELSEPG=PG+1:AL=1
:RETURN
78 W=(63-(Q+6)):IF W=0 THEN75
79 RN=INT((CO-40)/2):PRINT#U,STR
ING$(RN,32);STRING$(40,42)
80 W=(W-2):IFW=<0THEN75ELSEPRINT
#U,STRING$(W,13):GOTO75
81 ATTR1,0:FORT=18TO22:LOCATE1,T
:PRINTST$;:NEXTT:RETURN
82 LOCATE1,20:ATTR0,0,B:PRINT"YO
U HAVE ENTERED TOO MANY CHARACTE
RS";:ATTR1,0:LOCATE11,2:GOSUB139
:RETURN
83 LOCATE2,20:ATTR0,0,B:PRINT"FI
LENAME CAN'T EXCEED 8 CHARACTERS
";:ATTR1,0:GOSUB139:RETURN
84 CLS:LOCATE10,0:PRINT"PRINT OP
TION SELECT":LOCATE10,1:PRINTSTR
ING$(19,"=")
85 LOCATE0,3:PRINT"1. STANDARD /
 NORMAL ..........<10 CPI>":LOCA
TE0,5:PRINT"2. STANDARD / ITALIC
 ..........<10 CPI>"
86 LOCATE0,7:PRINT"3. STANDARD /
 N.L.Q............<10 CPI>":LOCA
TE0,9:PRINT"4. STANDARD / N.L.Q.
 / ITALIC..<10 CPI>"
87 LOCATE0,13:PRINT"5. ELITE / N
ORMAL..............<12 CPI>":LOC
ATE0,15:PRINT"6. ELITE / ITALIC.
.............<12 CPI>"
88 LOCATE0,17:PRINT"7. ELITE / N
.L.Q...............<12 CPI":LOCA
TE0,19:PRINT"8. ELITE / NORMAL /
 ITALIC....<12 CPI>"
89 LOCATE10,21:ATTR3,2,B:PRINT"[
PRESS KEY DESIRED]";:ATTR1,0:LOC
ATE39,22
90 IN$=INKEY$:ATTR0,0:IN=INSTR(1
,"12345678",IN$):IFIN=0ORIN$=""T
HEN90
91 IFW=40ANDIN<=4THENGOSUB139:LO
CATE0,23:ATTR3,2:PRINT"40 COLUMN
S CAN ONLY BE LISTED IN 12 CPI";
:ATTR1,0:LOCATE39,23:GOTO90
92 ON IN GOTO 93,94,95,96,97,98,
99,100
93 PRINT#-2,CHR$(27);CHR$(19);:R
ETURN
94 PRINT#-2,CHR$(27);CHR$(19);CH
R$(27);CHR$(66);CHR$(1);:RETURN
95 PRINT#-2,CHR$(27);CHR$(18);:R
ETURN
96 PRINT#-2,CHR$(27);CHR$(18);CH
R$(27);CHR$(66);CHR$(1);:RETURN
97 PRINT#-2,CHR$(27);CHR$(23);:R
ETURN
98 PRINT#-2,CHR$(27);CHR$(23);CH
R$(27);CHR$(66);CHR$(1);:RETURN
99 PRINT#-2,CHR$(27);CHR$(29);:R
ETURN
100 PRINT#-2,CHR$(27);CHR$(29);C
HR$(27);CHR$(66);CHR$(1);:RETURN
101 CLS:UNLOAD:GOSUB139:LOCATE6,
10:ATTR3,2,B:PRINT"DONE. RETURNI
NG TO MAIN MENU";:ATTR1,0:LOCATE
35,10:FORT=1TO2000:NEXTT:IFU=-2T
```

```
HENKILL"N/DAT":RUNELSERUN
102 CLS:LOCATE11,0:ATTR3,2:PRINT
"D I R E C T O R Y :";:ATTR1,0:L
OCATE38,0:PRINT:PRINT:FORD=3TO11
:DSKI$ 0,17,D,E$,F$:FORG=1TO8:IF
G<5THENI=(G-1)*32ELSEI=(G-5)*32
103 IFG=5THENE$=F$
104 PL$=MID$(E$,I+1,8)
105 IFASC(LEFT$(PL$,1))=255THEN1
08
106 IFASC(LEFT$(PL$,1))=0THENNEX
TG,D
107 H$=MID$(E$,I+9,3):PL$(R)=PL$
+"/"+H$:R=R+1:NEXTG,D
108 O=2:LOCATE0,O:FORD=1TOR-1
109 ATTR0,0:IFD/3<>INT(D/3)THENP
RINTPL$(D);"   ";ELSEPRINTPL$(D);
:O=O+1
110 NEXTD:HSTAT Z$,Z1,Z2,Y:IFZ2=
0THENY=Y+1ELSEY=Y+2
111 LOCATE10,Y:PRINTSTRING$(20,4
2):Y1=Y+2:Y2=Y1+1:Y3=Y2+1:LOCATE
0,Y1:PRINT"LOAD A FILE, ENTER FI
LE NAME":LOCATE0,Y2:PRINT"PRESS
<ENTER> TO ABORT.";
112 LOCATE24,Y3:ATTR3,2:PRINT"/D
AT IS ASSUMED";:ATTR1,0:LOCATE0,
Y3:ATTR0,0:LINEINPUT"ENTER FILEN
AME:";F$
113 IFLEN(F$)>8THENLOCATE0,Y3:PR
INT" ":GOTO112ELSEIFF$=""THEN8
114 GOSUB140
115 OPEN "I",#1,F$+".DAT":V=0
116 LINE INPUT #1,A$:A$(V)=A$:V=
V+1
117 M$=MID$(A$(0),6,1):IFM$="*"T
HENM=1
118 IFEOF(1)=-1 AND M<>1 THEN 12
1
119 IFEOF(1)<>-1THEN124
120 IF V=67 AND M<>1 THEN121ELSE
124
121 GJ=1:CLS:GOSUB139:LOCATE6,10
:ATTR3,3:PRINT"THIS IS NOT A STA
NDARD FILE";:ATTR1,0:LOCATE4,12:
ATTR3,3:PRINT"PRINT IT ANYWAY ?
<Y>ES OR <N>0";:ATTR1,0:LOCATE38
,12:ATTR0,0
122 IN$=INKEY$:IN=INSTR(1,"YN",I
N$):IFIN=0ORIN$=""THEN122ELSEIFI
N=1THENGOSUB84ELSEIFIN=2THEN1
123 IFGJ=1THEN133
124 IFV2=0 ANDV=67THENGOSUB126EL
SEIFV=67 ANDV2=1 THENGOSUB135ELS
EIFV=67 ANDV2=2 THENGOSUB133
125 GOTO116
126 X$=MID$(A$(0),2,2):W$=MID$(A
$(0),4,2):N=INSTR(1,A$(0),"/"):N
M$=MID$(A$(0),7,(N-1)):W=VAL(W$)
:X=VAL(X$):GOSUB139:CLS:LOCATE8,
0:ATTR3,2:PRINT"PRINT A FILE FRO
M DISK";:ATTR1,0:LOCATE38,0
127 LOCATE3,3:ATTR0,0:PRINT"THE
FOLLOWING FILE HAS BEEN LOADED":
LOCATE7,5:PRINT"INTO THE COMPUTE
RS MEMORY":LOCATE14,9:ATTR3,2:PR
INTNM$;:ATTR1,0:LOCATE38,7
128 LOCATE7,11:ATTR3,2:PRINT"IT
IS A ";:PRINTW$;:PRINT" COLUMN L
ISTING";:ATTR1,0:LOCATE38,10:IFW
=40THEN129ELSE130
129 LOCATE8,15:ATTR4,5:PRINT"YOU
 MUST USE 12 C.P.I.";:ATTR1,0:LO
CATE10,17:ATTR4,5:PRINT"TO PRINT
 THIS FILE";:ATTR1,0:LOCATE38,17
:GOTO131
130 LOCATE10,15:ATTR4,5:PRINT"IT
 IS FORMATTED FOR";:ATTR1,0:LOCA
TE9,17:ATTR4,5:PRINT"PRINTOUT AT
";X;:PRINT"C.P.I.";:ATTR1,0:LOCA
TE38,17
131 ATTR0,0:LOCATE1,22:PRINT"PRE
SS ANY KEY TO SELECT PRINTER COD
ES":ATTR1,0:LOCATE38,22
132 ATTR0,0:IFINKEY$=""THEN 132
ELSE GOSUB 84
133 CLS:LOCATE7,5:PRINT"POSITION
 PAPER IN PRINTER":LOCATE13,7:PR
INT"PRESS <ENTER>";:LOCATE6,9:PR
INT"TO PRINT THE ENTIRE LISTING"
;:LOCATE14,17:PRINT"<SPACEBAR>";
:LOCATE5,19:PRINT"FOR A PAUSE AF
TER EACH SHEET";:GOSUB139:ATTR1,
0:LOCATE38,19
134 ATTR0,0:ID$=INKEY$:IFID$=CHR
$(13)THENV2=1ELSEIFID$=" "THENV2
=2ELSEIFID$=""THEN134ELSE135
135 CLS:LOCATE14,10:ATTR3,2,B:PR
INT"NOW PRINTING";:ATTR1,0:LOCAT
E35,10:ATTR0,0
136 ATTR0,0:U=U+1:V=0:V4=1:FORT=
1TO66:PRINT#-2,A$(T):NEXTT:IFEOF
(1)=-1THEN137ELSEGOSUB140:RETURN
137 UNLOAD:CLS:LOCATE10,10:ATTR3
,2:PRINT"PRINTING IS FINISHED";:
ATTR1,0:LOCATE6,20:ATTR0,0,B:PRI
NT"PRESS ANY KEY FOR MAIN MENU";
:ATTR1,0:LOCATE38,22:GOSUB139
138 ATTR0,0:IFINKEY$=""THEN138EL
SERUN
139 FORS=1TO10:SOUND180,1:NEXT:R
ETURN
140 CLS:LOCATE5,10:ATTR3,2,B:PRI
NT"NOW LOADING PAGE";:PRINT(U+1)
;:PRINT"INTO MEMORY";:ATTR1,0:LO
CATE38,10:ATTR0,0:RETURN
```

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Thanks for the Memory

By Thomas Kocourek and Kenneth Rockwell

Many programs have been written to use the full 64K of the CoCo. These programs are often clumsy to use or have dubious value. *NewBoots* is a utility program written for the 64K CoCo. It is easy to use and will work on either disk or cassette systems.

"Why," you might ask, "do we need another 64K program?" Because there are times when you need maximum memory. A good example is *Colorkit* by Prickly-Pear Software. This machine language utility usually occupies the upper 5K of memory in a 32K CoCo. The memory is normally lost to you. But if you use *NewBoots* to load *Colorkit* with an offset to &HE000, you gain the memory back, along with an additional bonus. You can run your BASIC program and not worry about scrambling *Colorkit*. Other position-independent-coded, machine language programs can be loaded in a similar manner. How do you know if an ML program is position-independent? Load it with a small offset and execute it (i.e., type `LOADM` or `CLOADM`"*program name*",`512`). If the program works, it is position-independent.

Upon pressing the reset button, you will lose the 64K mode. To remedy this annoyance, we've written an automatic re-boot to 64K routine and incorporated it into *NewBoots*. To disable this feature, you must cold start the CoCo (via `POKE113,0` and pressing ENTER and reset, or shutting off the power).

Thomas Kocourek is an electronics technician who enjoys sharing his two CoCos with his family. Kenneth Rockwell bought his first Color Computer five years ago to use in his heating and air conditioning business, and he's been a CoCo nut ever since.

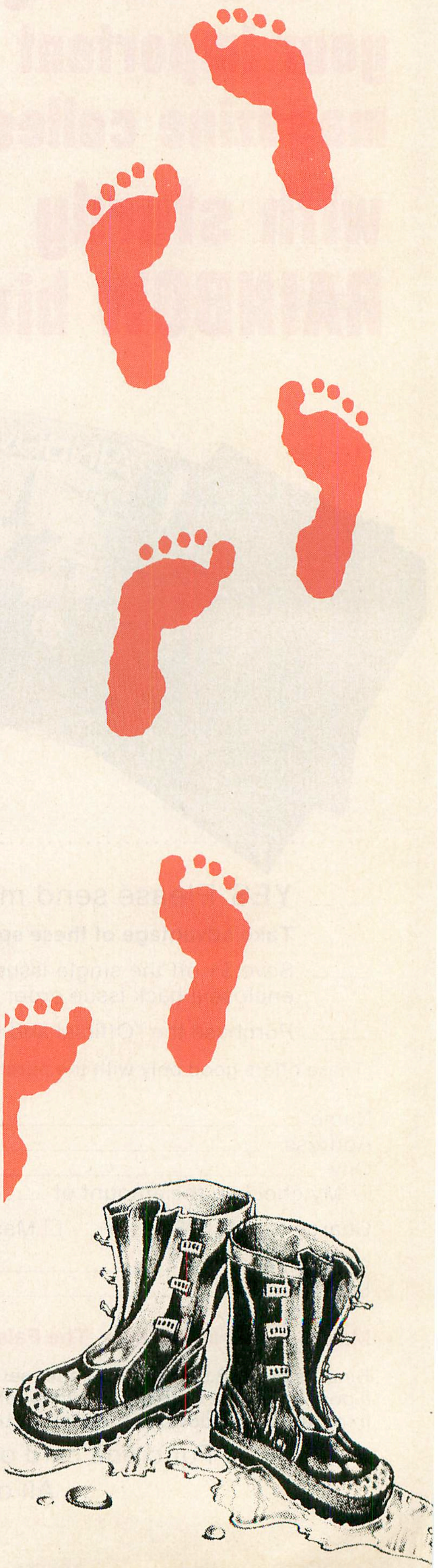
How It Works

The first thing *NewBoots* does is copy the BASIC ROMs into the high RAM bank. This is achieved by the short ML routine in lines 26 to 31, which is no longer needed once BASIC has been copied.

Lines 35, 39, 43 and 48 poke new values into parts of the Color BASIC ROM area. Line 35 changes the cursor to a "checkerboard" pattern instead of a solid block; you can substitute a code between 128 and 143 to change the cursor pattern. Line 39 changes the cursor flashing rate; Line 43 sets the system to cycle through each available cursor pattern. Line 48 changes the prompt message from "OK" to "go" by poking the ASCII codes for 'g' and 'o' into the BASIC prompt location.

Lines 56 to 79 let you change the start-up message that appears when a cold start is performed. Line 56 checks to see if Disk BASIC 1.0, 1.1 or JDOS 1.11 are present (or if there is no disk ROM); lines 58, 61, 64 and 67 set the appropriate start address for the start-up message in each version. Line 72 puts the new message in A$. Lines 76 to 79 poke the new message into the proper place in the disk (or Extended BASIC) ROM area.

The last step is to insert a patch in the lower 32K area, to switch the high RAM bank back in when the reset button is pressed (which usually switches the ROMs back in). This way the patches will still be effective. Lines 84 to 87 poke in and execute a short ML routine to do just that. Finally, Line 93 executes a ROM routine to clear the screen and then performs a warm start of BASIC to put the patches into effect. ☐



The listing: NEWBOOTS

```
10 '''''''''''''''''''''''''''''
11 '  BOOT A CUSTOM PROMPT AND '
12 '     CURSOR WITH 64K RAM    '
13 '     FROM   TOM KOCOUREK    '
14 '     AND    KEN ROCKWELL    '
15 '         RT2, BOX54         '
16 '         EMERSON,GA         '
17 '    FOR RS DISK 1.0, 1.1,   '
18 '   JDOS 1.11 & EXT. BASIC   '
19 '''''''''''''''''''''''''''''
20 ' SETUP BASIC FOR AUTO BOOT
21 '''''''''''''''''''''''''''''
22 CLEAR200,32761
23 '''''''''''''''''''''''''''''
24 '    64K BOOT OVER ROUTINE
25 '''''''''''''''''''''''''''''
26 FOR A=12288 TO 12313:READ B
27 POKE A,B:NEXT:EXEC12288
28 DATA26,80,142,128,0,236,132
29 DATA183,255,223,237,129,183
30 DATA255,222,140,254,255,37,24
1
31 DATA183,255,223,28,175,57
32 '''''''''''''''''''''''''''''
33 '   REDEFINE THE CURSOR
34 '''''''''''''''''''''''''''''
35 POKE41384,134
36 '''''''''''''''''''''''''''''
37 ' CHANGE CURSOR FLASHING RATE
38 '''''''''''''''''''''''''''''
39 POKE41374,5:POKE41388,9
40 '''''''''''''''''''''''''''''
41 ' CHANGE CURSOR PATTERNS BY 1
42 '''''''''''''''''''''''''''''
43 POKE41382,1
44 '''''''''''''''''''''''''''''
45 ' CHANGE PROMPT FROM "OK"
46 '          TO "go"
47 '''''''''''''''''''''''''''''
48 POKE44014,103:POKE44015,111
49 '''''''''''''''''''''''''''''
50 '  YOU CAN MAKE A START-UP
51 ' MESSAGE OF A$ WITH NO MORE
52 ' CHARACTERS THEN 86 FOR DISK
53 '  OR 81 FOR EXTENDED BASIC
54 '    OR 75 FOR JDOS 1.11
55 '''''''''''''''''''''''''''''
56 A=PEEK(49446):IFA=144THEN58EL
SEIFA=68THEN61ELSEIFA=251THEN64E
LSE67
57 ' COME HERE IF RS DISK 1.1
58 A=86:S=49465:E=49551:GOTO72
59 '''''''''''''''''''''''''''''
60 ' COME HERE IF RS DISK 1.0
61 A=86:S=49446:E=49532:GOTO72
62 '''''''''''''''''''''''''''''
63 ' COME HERE IF JDOS 1.11
64 A=76:S=49182:E=49258:GOTO72
65 '''''''''''''''''''''''''''''
66 ' COME HERE IF EXTENDED BASIC
67 A=81:S=33000:E=33081
68 '''''''''''''''''''''''''''''
69 ' PUT YOUR MESSAGE IN THE
70 ' NEXT LINE AS "A$=...."
71 '''''''''''''''''''''''''''''
72 A$="         CUSTOM 64K RAM"
73 '''''''''''''''''''''''''''''
74 ' POKE MESSAGE INTO BASIC
75 '''''''''''''''''''''''''''''
76 IFLEN(A$)<A THENA$=A$+STRING$
(A-LEN(A$),32)ELSEIFLEN(A$)>A TH
EN A$=LEFT$(A$,A)
77 FOR Z=S TO (E-1)
78 POKE Z,ASC(MID$(A$,(Z+1)-S,1)
)
79 NEXTZ
80 '''''''''''''''''''''''''''''
81 ' AUTO BOOT ON RESET ROUTINE
82 '''''''''''''''''''''''''''''
83 DATA 52, 23, 142, 127, 249, 1
34, 126, 167, 4, 220, 114, 237,
5, 134, 183, 167, 1, 204, 255, 2
23
84 DATA 237, 2, 134, 18, 167, 0,
 159, 114, 48, 30, 159, 35, 159,
 39, 204, 159, 114, 190, 192, 0
85 DATA 140, 68, 75, 38, 5, 142,
 192, 0, 32, 3, 142, 128, 0, 48,
 1, 16, 163, 132, 38, 249
86 DATA  204, 18, 18, 237, 132,
53, 151
87 FORA=12288TO12354:READB:POKEA
,B:NEXTA:EXEC12288
88 ' USE THIS LINE FOR LOADING
   YOUR M/L PROGRAM.
89 '''''''''''''''''''''''''''''
90 '     DO A "CLS" AND THEN A
91 '    WARM RE-START OF BASIC
92 '''''''''''''''''''''''''''''
93 EXEC43304:EXEC32770
```

DOWNLOADS

Avoiding Hang-Ups in the All-RAM Mode

By Dan Downard
Rainbow Contributing Editor

Using Auto-Start on DOS *[RAINBOW, November '84], I boot up* Track 40 *and* Disk Menu. *A problem exists with ML programs that exit by jumping to address $FFFE. Under normal conditions, this address should be a reset vector but, since I am operating in the all-RAM mode, jumping to this address prints garbage on the screen and hangs up the computer. Where would this address be placed, and what does the memory map look like in the all-RAM mode?*

Wayne C. Bell
Bangor, PA

Wayne, if you look at address $FFFE in memory, you will notice that it contains $A027. This is the warm start address for BASIC. There is one catch, though. You must first clear $71, the warm start flag. Try something like this:

```
CLR $71
JMP $A027
```

In BASIC this is where the infamous `POKE113,0:EXEC40999` comes from. Unfortunately, on the CoCo 3 this trick does not do a true cold start.

Telecommunications Help

I currently have a CoCo 3, FD 501 Disk Drive, DMP-105 Printer and a DCM-3 Direct Connect Modem. I have asked my local Radio Shack dealer what else I need in order to upload/download programs via telecommunications, and they could not give me a solid answer. Can you help?

Chuck Katsekes
Newport, NC

Besides a cable between your modem and CoCo, all you need is a terminal (communications) program. If you buy the RS-232 pack, there is a terminal program built in, but it's not very good. I would recommend a terminal program with Xmodem protocol for reliable downloading.

Artifact Colors on CoCo 3

At Christmas time I upgraded from a CoCo 2 system to CoCo 3 with an RGB CM-8 monitor I like very much. However, to my disappointment, many of the games I liked on the CoCo 2 won't run right on my new system. Some won't load at all and others load and run, but without color.

Since the reason I don't have color on some of the games is the RGB monitor and since I have the TV from my CoCo 2 system and since the CoCo 3 has both a place for the monitor to connect to and a place for a TV to connect to, can I hook both of them up at the same time and then just turn on whichever one I want to use? Or will there be a problem, such as one cutting the other out or perhaps the hookup damaging the CoCo?

William Colton Jr.
Malad, ID

It won't hurt your computer to use all three of the video outputs at one time, William. However, a program has been developed to simulate artifacted colors on your CM-8. Check the Spectrum Projects ad for *RGB Patch.*

Disk Run-On

I own a CoCo 2 with 'F' board and recently purchased a disk drive from True Data Products. The drive is a Teac 55B with hard drive controller, Disk Extended Color BASIC 1.0. The two sides are accessed as Drive 0 and Drive 1. The problem is that when I either insert or extract the disk, the motor runs for about 10 seconds on its own before the lever is engaged. Is this normal? Will it harm the drive if I engage with the motor running?

Richard Christenson
Ellendale, ND

Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago, and he has built several 68XX systems.

Richard, this is the normal way your disk should operate. The disk motor is turned on for a few seconds to allow the drive to get up to speed before any operation takes place. It is again delayed after each operation to prevent it from being turned off in case another operation follows. It will not hurt your drive; in fact, it helps by not turning it on and off so much.

VIP Underlining

*I have an unusual problem with my word processing program (*VIP Writer*). It's a very good software program for word processing but, when I print any output to my printer (Smith-Corona L-1000 daisy wheel), I cannot get any words underlined. I've tried all of the program's underlining procedures and changing the printer's ASC formats, all to no avail. Any ideas?*

Randall E. Berkland
Yokota Air Base, Japan

To get the underline, you have to use embedded commands depending on the printer being used. See the next letter, Randall.

Underlines for Spaces

Following the instructions in my 64K CoCo, Telewriter 64, *and Tandy DWP-220 printer manuals, and pursuant to a telephone call to* Telewriter*'s office in California, I have inserted the suggested embedded format commands in my CoCo (at 600 baud) and have obtained underlining; however, my underlining is only printed directly under each word. What I am getting now is:*

underlines under each word

when, in fact, what I want is:

underlines including the spaces between words.

The embedded commands are "caret D1 15" followed by "caret D2 14." Can you give me a new embedded command that will allow me to underline the spaces between words also? Other than this fault, I am highly pleased with the power of the Telewriter 64, *CoCo, and Tandy DWP-220 combination, and I use them in my business as well as home as our prime word processor.*

Bill Hodges
Columbia, SC

Thanks for the tip, Bill. We have had several people ask this question. I'm sorry, but I don't have the answer. We'll see if any of our other readers have solved your problem! At the same time, keep in mind that the majority of printers use different control codes.

Variable Passing

I think I can help with your answer to Warren Cole [February '87]. I recently did a review of a new utility that would give Warren exactly what he asked for without OS-9. I tested Varisave *on an 'F' board CoCo 1, CoCo 2 and CoCo 3. It works on all three and allows you to run a new program while saving variables (names and data — string and numeric — arrays or not) from a previous program. It simulates the* `CHAIN` *command.*

Larry Elman
Port Jefferson Station, NY

Thanks for the help, Larry. I have since read the review, and you are correct. *Varisave* will indeed allow the passing of variables.

Several other readers suggested using the unused graphics pages with peeks and pokes to save variables. Where there's a will, there's a way.

A Question Trio

I am having a problem with disk labels. After several weeks, sometimes sooner, the labels begin peeling off the disk, at the edges. This causes some further peeling when the disk is inserted into the disk drive. I tried pressing on the label more ardently, holding my hand against the label (so the body heat might set the label better), and don't know what else to do to keep them on the disks.

Another problem is that I have recently entered the field of OS-9 programs and have several disks with these on them. I would like to have a printed "disk-list," or inventory, of these programs, but all I get when I try to make one is a series of blue lines on the screen, and garbage if I try to print the list of programs.

Now, my third and last question. I try to keep the CoCo clean and covered when not in use. When I first turn it on, I also have the DMP-130 printer and the two disk drives turned on. I am using a color television as a monitor. When the CoCo is turned on, the screen is supposed to be green, but shows a white screen instead. Hitting the reset button several times, or turning the CoCo off and back on, usually gets the screen green. I have opened the CoCo case and cleaned the interior of the unit several times, so that does not appear to be the problem. I also removed the disk drives and the printer, in order to track down the culprit, but still have the same problem.

M.L. Braun
Bellevue, OH

I have finally found a solution to your disk label problems. Find a felt-tip pen with a light colored ink. Write directly on the disk jacket. We use this method here at the RAINBOW, and it seems to work fine. Needless to say, don't press too hard!

You must have OS-9 to list these directories, M.L. After booting OS-9, just enter the command `DIR /DO >/P` and you will get a printed disk directory of your working directory.

As far as your white screen is concerned, it sounds to me like your color burst signal is a little out of tolerance. There is a trimmer capacitor next to the crystal that can be adjusted, along with a few coils in the RF compartment.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

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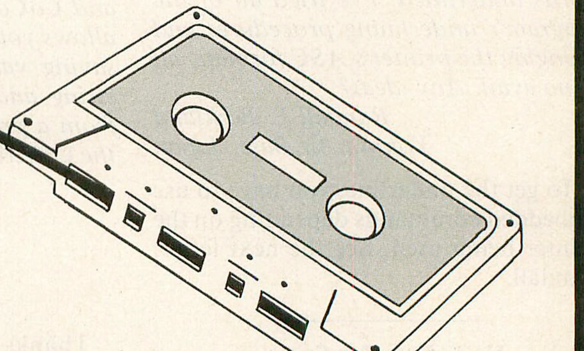

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Plus 18 programs from our **May 1984** issue of THE RAINBOW.

OS-9 MEMORY

The Advantage of Processes

By Peter Dibble

You've squeezed as hard as you can and your program still needs 200K. You have your CoCo 3 stuffed with memory all the way up to 512K, so there's plenty of memory there, but you can only apply 64K of it to your problem. What can you do?

You need more than one process to solve your problem. Each process gets its own address space. You need 200K? You might be able to divide your program among five 40K address spaces.

It isn't too hard to slice a program into several processes. The trick is communication among the processes. The more restricted the communication, the better the resulting system will work. In this article I'll discuss cases that require simple one-way communication.

Passing Parameters Through the Shell

If you can cut out part of the program that does a piece of work but doesn't have any effect on the rest of the program, you can easily make a process of it. Write it as a separate program and pass it any data it needs as parameters.

Be sure not to pass any pointers between processes. Remember that each process gets its own address space. Any pointers you pass will have no meaning in another address space.

A text editor or terminal program might want to start a process to do printing. By starting a separate process, you save space. You can also get printing in the background while you continue to work. I've included a set of BASIC09 programs that print a buffer. They're simple, but you can probably imagine more complicated versions.

If you want to try the demonstration program, type in the two procedures, save them, and pack the program `printer`. When you run `editor`, it sends the text buffer to the shell. This sends it to the program called `printer`, which displays it on your screen.

You might want to experiment with adding an ampersand (&) at the end of `cmd_line` before you invoke shell in the editor procedure.

Passing parameters through the BASIC09 `shell` command doesn't work very well. The problem is that the OS-9 shell gets into the act. You can only pass very ordinary text through the shell. In the example program, I had to replace carriage returns and exclamation points with alternate characters to prevent the shell from seeing them and getting excited. There is no such problem if you use the OS-9 `F$Fork` system call from assembler or C.

Simple Pipes

You can get as many processes as you like involved with a problem without writing any special code if you use pipes through the shell. There is no popular example of this technique, but I have seen the Microware C compiler run with pipes between its phases. It is fast! Let's look at the C compiler in more detail.

Programs in C are converted to program modules by a sequence of operations:

- The preprocessor includes files and expands macros.
- The compiler itself converts the output of the preprocessor to assembly language in one or two passes (depending on whether you use the Level I or II version).
- The optimizer does some simple improvements on the assembly language.
- The assembler takes the output of the optimizer and converts it to a relocatable object file.
- The linker converts that to an executable module.

What you really want is something that makes an executable module from a C program. The five or six steps are there for Microware's convenience, not for yours. There are various reasons for cutting the process into pieces, but on a 6809 there is a compelling reason. A C compiler in one piece would not fit in 64K.

Pipes through the shell work for the C compiler, because data flows through the program in one

---

Peter Dibble has a bachelor's degree in chemistry and is currently a graduate student in computer science. He has worked as an applications programmer, systems programmer and as the user services assistant director for the University of Rochester Computing Center. With Dale Puckett, he is the co-author of The Complete Rainbow Guide to OS-9.

direction. If the linker had to feed data to the preprocessor, hooking the C compiler together would have been difficult.

A spelling checker is another example of something that can be broken into pieces connected by pipes. The input is the file you want to check. The output is a list of misspelled words. The steps are:

- Break the file into words
- Sort the words
- Remove redundant copies of words
- Merge the words with a dictionary keeping only words that don't match

The output is a list of words that weren't in the dictionary.

Any number of business problems break into pieces that can be joined with pipes. Text processors are also good candidates.

That's about all we can do without leaving BASIC09. Next time I'll show you some tricks that use assembly language. I'll do them as subroutines you can call from BASIC09 so you don't need to be an assembly language programmer to use them. ☐

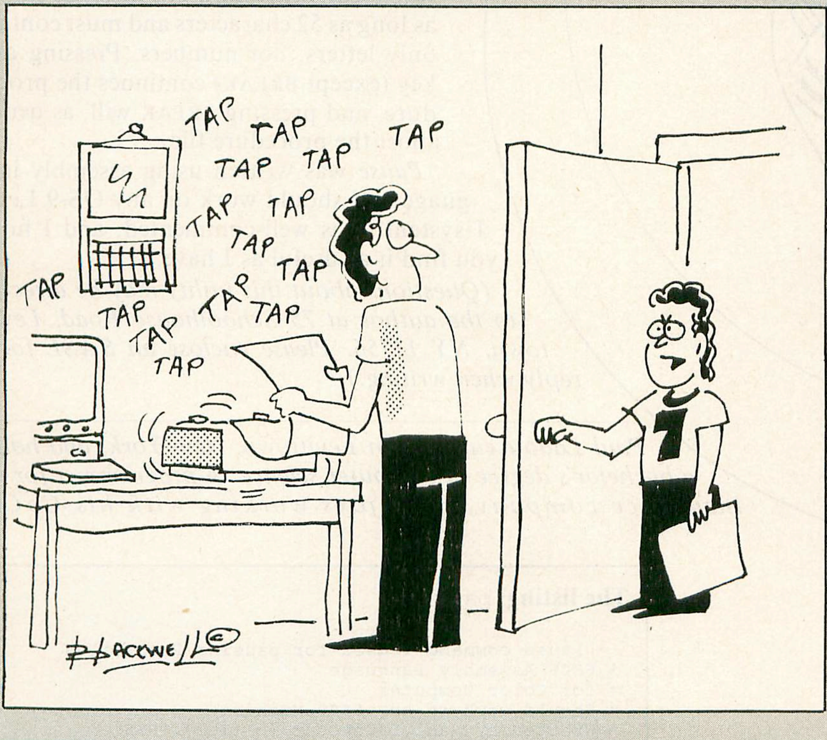
Listing 1: `editor`

```
PROCEDURE editor
 0000      (* ------------------------------------------------------*)
 003B      (* This program pretends to be part of a text editor that*)
 0076      (* starts a process to print a buffer.                   *)
 00B1      (* ------------------------------------------------------*)
 00EC      DIM cmd_line:STRING[500] \(* Build the print buffer here *)
 0119      DIM i:INTEGER
 0120      DIM InStr:STRING[40]      \(* For reading data statements *)
 0152      DIM DataLength:INTEGER    \(* A constant                  *)
 0169      DataLength=11             \(* Number of strings in DATA   *)
 0193      cmd_line=""               \(* Initialize the print buffer *)
 01BB      (* ------------------------------------------------------*)
 01F6      (* Read the text from data statements.  Of course, a    *)
 0231      (* real editor wouldn't do this.                        *)
 026C      (* ------------------------------------------------------*)
 02A7      FOR i=1 TO DataLength
 02B8        READ InStr
 02BD        cmd_line=cmd line+InStr
 02C9      NEXT i
 02D4      (* ------------------------------------------------------*)
 030F      (* Finish off the command line.  It will look something *)
 034A      (* like:  printer (50, "...")                           *)
 0385      (* ------------------------------------------------------*)
 03C0      cmd_line="printer "+"("+STR$(LEN(cmd_line)+1)+", """
                +cmd_line+""")"
 03EB      SHELL cmd_line
 03F0      DATA "Allas, poor Yorick|",CHR$(6)
 040E      DATA "I knew him, Horatio,"," a fellow of infinite jest,"
 0447      DATA CHR$(6)," of most excellent fancy."
 046C      DATA CHR$(6),"He hath bore me on his back "
 0493      DATA "a thousand times",CHR$(6)
 04AE      DATA "          From Hamlet  by Shakespeare"
```

Listing 2: `printer`

```
PROCEDURE Printer
 0000      (* ------------------------------------------------------*)
 003B      (* This demonstrates the form of a program that would   *)
 0076      (* print a buffer.  It should be called with a command  *)
 00B1      (* line of the form: printer (length, buffer)           *)
```

```
00EC      (* ---------------------------------------------------------*)
0127      PARAM Length:INTEGER
012E      (* ---------------------------------------------------------*)
0169      (* It is easier to work with an array of bytes than a      *)
01A4      (* string so lie to OS-9.  Declare the second parameter    *)
01DF      (* as an array.                                            *)
021A      (* ---------------------------------------------------------*)
0255      PARAM buffer(501):BYTE
0261      DIM i:INTEGER
0268      FOR i=1 TO Length   \(* Print each character from buffer *)
029F        (* -------------------------------------------------------*)
02D8        (* Carriage returns and exclamation points don't pass  *)
0311        (* through SHELL well, so they come in as | and chr 6  *)
034A        (* This loop converts them back to <cr> and ! before   *)
0383        (* printing them.                                      *)
03BC        (* -------------------------------------------------------*)
03F5        IF buffer(i)=6 THEN
0404          buffer(i)=13
040F        ENDIF
0411        IF buffer(i)=ASC("|") THEN
0422          buffer(i)=ASC("!")
042F        ENDIF
0431        PRINT CHR$(buffer(i));            \(* Print one character   *)
043B      NEXT i
0446      PRINT                               \(* Close with a new line *)
0463      BYE
```



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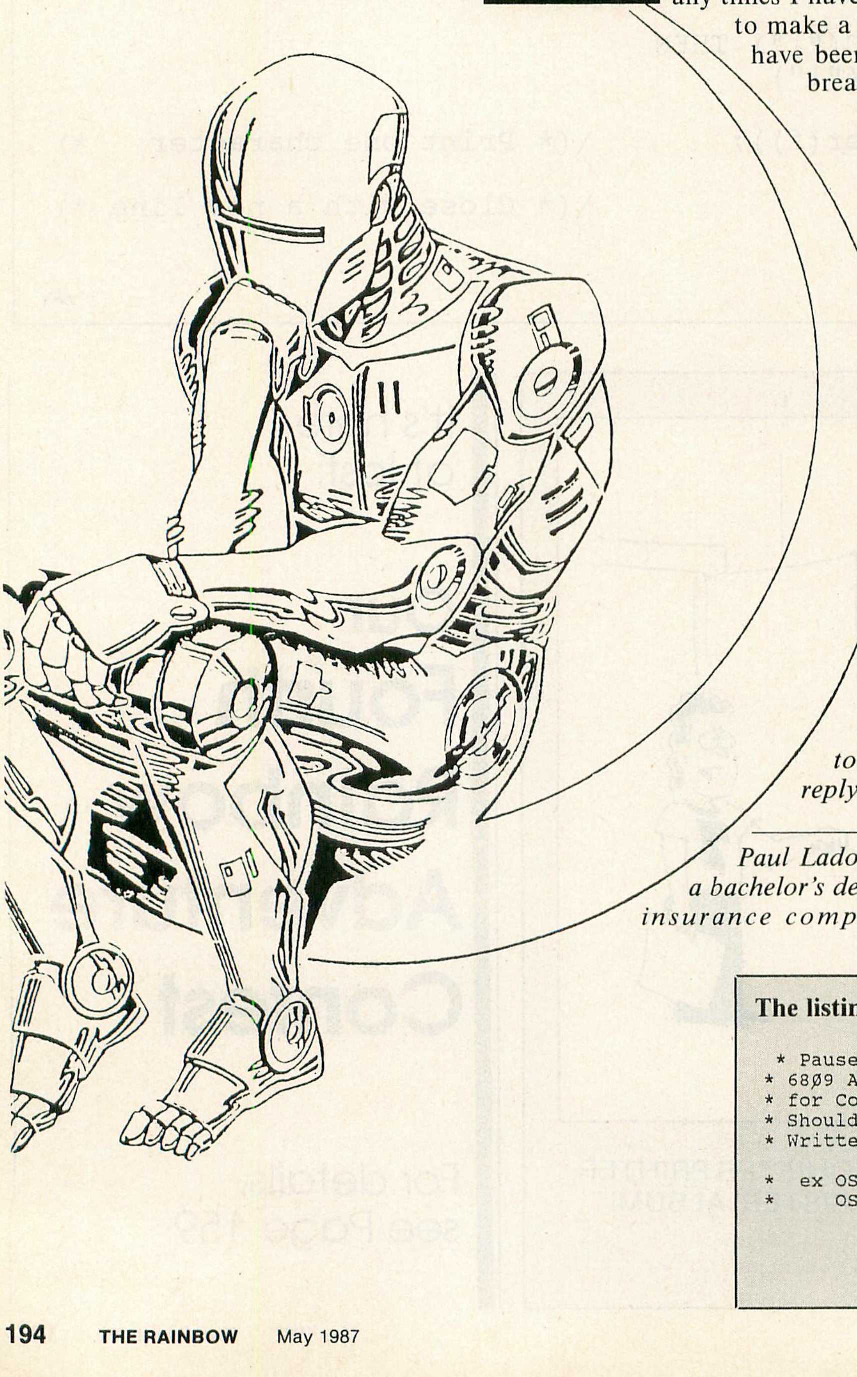
For details,
see Page 159

OS-9 UTILITY

A Pause for Thought

By Paul Ladouceur



Many times I have been working away with my OS-9 system only to make a mistake that locks up my computer. This could have been avoided if I had had the chance to catch my breath and think about what I should do next. Thus was born the idea for *Pause*, a command that allows pausing between job steps in a procedure file until a key is pressed. It is similar to the MS-DOS Pause command used in batch files. It is handy for putting a message on the screen to stop that headlong flight into lock-up.

The syntax is `pause` *"message"* or just `pause`, where *message* is any notes you want displayed before the "press any key when ready" prompt. The message can be as long as 52 characters and must contain only letters, not numbers. Pressing any key (except BREAK) continues the procedure, and pressing BREAK will, as usual, abort the procedure file.

Pause was written using assembly language and should work on any OS-9 Level I system. It is well-commented, and I hope you find it as useful as I have.

(Questions about this utility may be directed to the author at 75 Schoolhouse Road, Levittown, NY 11756. Please enclose an SASE for a reply when writing.) ☐

Paul Ladouceur lives in Levittown, New York, and holds a bachelor's degree in computer science. A programmer for an insurance company, he enjoys working with his CoCo.

The listing: `pause`

```
 * Pause command : used for pausing Proc files
* 6809 Assembly Language
* for Color Computer
* Should work on any 6809 Machine
* Written by Paul Ladouceur (c) July 1986

*   ex OS9:Pause
*     OS9:Pause "message"

          nam  PAUSE

         ifp1
```

```
          use  /d0/defs/Os9DEfs
          endc

          mod  Prglen,Prgnam,Type,Revs,Prstart,Size
Type      set  Prgrm+Objct
Revs      set  ReEnt+1
Prgnam    fcs  /Pause/

          org  0
Buf       rmb  2
Count     rmb  1
          rmb  200  stack
          rmb  52   parm   message characters
Size      equ  .

* open path
Prstart   TFR  X,Y         store parm addr
          leax filnam,pcr  device terminal
          lda  #Updat.     read from term not proc
          Os9  I$Open      open to terminal
          bcs  error
*         sta  Ipath       output path in A register

*Test for special message
          TFR  Y,X         get back parm addr
          ldb  0,x         get 1st char
          cmpb #'"         something in quotes
          bne  stdmes      ?no
          clrb             initialize b
          stb  Count,u     initialize count
          ldy  #1          # of char to write
          leax 1,x         addr of 1st char
Loopwt    ldb  ,x          get char
          cmpb  #'"        end quote yet?
          beq  LF          ?yes
          ldb  Count,u     get char count
          incb             add 1 to count
          cmpb #52         52 char max
          bhi  LF          ?yes
          stb  Count,u     store count
          Os9  I$Write     write mesage
          bcs  error
          leax 1,x         add 1 to parm addr
          bra  Loopwt
LF        Bsr  Linefeed

* Write to /Term
stdmes     leax Mesl,pcr     get addr of mesl
          ldy  #Mlenl      get len of mesl
          Os9  I$Write     write message to screen
          bcs  error

* Read from /Term till there is a character
          leax Buf,u       keybroad buffer
          ldy  #1          get 1 char
          Os9  I$Read      read keyboard wait for char
          bcs  error
          bsr  Linefeed

* Close /Term and go back to stdin/stdout
          Os9  I$Close
          bcs  error

* NO ERROR
          clrb ** no error **
          bra  noerror
error     ldb  #203
noerror   Os9  F$Exit

* SUBROUTINES

Linefeed  leax Lfdata,pcr
          Ldy  #2         2 character to write
          Os9  I$Write    linefeed screen line
          bcs  error
          rts

**** CONSTANTS ******

* MESSAGE
Mesl      fcc  /Press any key when ready  /
Mlenl     equ  *-Mesl
* FILE NAME
filnam    fcs  "/TERM"
* SCREEN Cntrol
Lfdata    fcb $0d,$0a

          emod
Prglen    equ  *
          End
```

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KISSable OS-9

Setting the Stage for OS-9 Level II

By Dale L. Puckett
Rainbow Contributing Editor

Bill Brady's latest communication program, *Wiz*, is the first third-party product we've seen that captures part of the power built into the just-released CoCo Version of OS-9 Level II. *Wiz* will sell for $79.95 at FHL in Syracuse, New York.

CoCo 2 owners who are running OS-9 Level I, Version 2 will be interested in Brady's *BigT*. *BigT* is *Wiz* without the Level II windows and is an excellent communications program. You can download the binary version of *BigT* from both Delphi and CompuServe. A $20 donation to William Brady, 4776-B Carmody Court, Harwood, MD 20776, will bring you a printed copy of the manual and the source code.

If you love the many online conferences on RAINBOW's OS-9 SIG, you'll find this program is a dream come true. While in a conference, you type your part of the conversation in a small window at the bottom of the screen. Your great thoughts stay put and can be edited in that window until you press the ENTER key. While you're typing in your private window, you can read all conference chatter in *Wiz*'s main window. When you press ENTER, *Wiz* sends your thought to Delphi. It appears in the main *Wiz* window when Delphi sends it to everyone in the conference.

In the meantime, a one-line status window at the top of the screen lets you know how many minutes you have been online and reports your current communications parameters. If you need to do something else with your computer for a second, you can tell *Wiz* to wait, and go about your business. When you do this, the special *Wiz* output path to your RS-232 port is closed. Here's a possible use:

You're reading the Forum messages on Delphi and learn that someone needs help finding the `ident` of a module. If you want to help, you can start your reply to the question while online with *Wiz*, then tell *Wiz* to wait temporarily. At this time you can redirect the output of your OS-9 `ident` utility command to your `/T2` device descriptor. This will send the report to Delphi where it will be inserted in your message. As soon as the `ident` command is finished, you can bring *Wiz* back to life and add any comments. Amazing!

Why Wiz Is Important

Brady's *Wiz* is an important product because of the fine job it does in letting your OS-9 based Color Computer communicate with the rest of the world. However, its real importance stems from the fact that it shows that BASIC09, running in the OS-9 Level II windowing environment, is a tremendously viable development tool.

"Another significant thing about both *Wiz* and *BigT* is the way they are constructed and distributed," Brady said. "If you run the OS-9 `ident` utility on the *BigT* file, you will see it contains both BASIC09 I-Code modules and 6809 object code modules. All modules in the file load at once, and *BigT* assumes they are all in memory and immediately links to them with OS-9 system calls."

Brady's approach makes it easier for users because they need only load and run one program file. They do not have to worry about loading the program's modules by hand — or ensuring they are present in the current execution directory where OS-9 can find them automatically. However, Brady's approach points out an important technical detail that bears explaining.

"By loading all modules in the file at once, we ensure they are loaded contiguously," Brady said. "Under Level II this approach becomes very important because of the memory management hardware used in the CoCo 3."

When you load a program module into your CoCo 3 — or when OS-9 switches a module into a 64K workspace used by a process — it will move an entire 8K block of memory into the space. This will happen even if the module is only 20 bytes long.

This means you need to package your program modules into files that are no longer than 8K bytes long. If they go one byte past the 8K, you might as well add more to the program because you can use up to 16K for the same cost.

Let's use the *Wiz* file as an example. It contains five modules: `WTerm`, 15,435 bytes; `WizDraw`, 1,365 *bytes;* `WiXmod`, 4,833 bytes; `SysCall`, 98 bytes; and `InKey`, 94 bytes. The file contains 21,825 bytes. When it is loaded into memory, it takes up three 8K blocks or 24,576 bytes of memory. If Brady expands the program, he has another

---

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and coauthor, with Peter Dibble, of* The Official Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale works as a U.S. Coast Guard lieutenant and lives on Governors Island in New York Harbor.*

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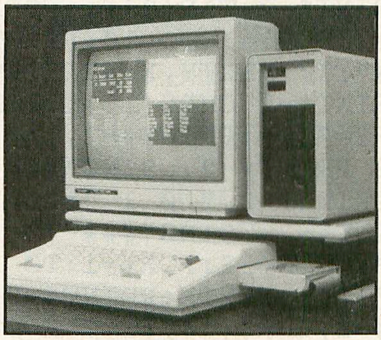

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The WIZ

By Bill Brady

The Wiz is the **First** and **Only** program designed for the CoCo III that uses **WINDOWS!** The Wiz is a smart terminal and communications program for the CoCo III and OS9 Level II. Making use of multiple windows and overlay windows with pop up dialog boxes The Wiz really shines. Features include: Autolog- lets you configure The Wiz's colors, characters boldface etc., Xmodem and text send and receive, sleep mode, conference mode uses a separate window for your text, usage log and much more. Does not work with the CoCo's internal bit banger serial port. The complete package includes a special ACIA driver that allows baud rates from 300 to 19,200 baud. Requires the RS232 pak or the Disto RS232 or similar port plus a CoCo III with OS9 Level II.

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2,751 bytes to work with before he must invest another 8K of memory in the process.

Now, let's look at what would have happened if Brady had left all five of these modules in separate modules and then loaded them. `WTerm` would have used two 8K blocks or 16,384 bytes, and `WizDraw`, `WiXmod`, `SysCall` and `Inkey` would have each taken 8K bytes, for a grand total of 49,152 bytes. Brady's method saved 24,576 bytes of program memory area. Keep in mind that even though you may have 512K of memory available to you with OS-9 Level II, each process — defined as a program running — can only use 64K of memory.

> ***"Microware did a beautiful job on this thing."***

A Closer Look at *BigT*

BigT requires a CoCo 2 with an 80-column screen, a Multi-Pak, an RS-232 pack, BASIC09 and OS-9 Version 2.0. Rather than use a capture buffer, *BigT* uses the XON/XOFF protocol to tell the host to stop sending, while it is sending data to your printer or a disk file.

One of the modules that comes in the *BigT* file is an optimized device driver, `SIO`. This driver optimizes your CoCo when it is being used as a terminal with any host. It is reliable with screen drivers that do not disable interrupts all the way to 19.2K baud.

You can print the last 1,024 characters received at any time by pressing ALT-P. Or you can redisplay those characters by pressing ALT-S. You can also download everything you receive to a disk file or upload text files to the host. An auto-log feature, similar to that used by the Tandy Model 100 laptop computer, makes automatic operation possible for some tasks.

BigT lets you use the error-free Xmodem protocol to transfer binary files between two computers, and it gives you two 80-character macros you can recall with the two CoCo 3 function keys. Brady is hoping to come up with an OS-9 standard protocol similar to the MacBinary protocol that lets you automatically download executable program files from a host like Delphi.

Wiz adds the ALT-W, ALT-C and ALT-P keys to the *BigT* repertoire. ALT-W is used to put *Wiz* to sleep. ALT-C puts you in the conference mode and ALT-P gives you a way to update the time-in status bar along the top of your screen.

The *Wiz* config menu lets you set the color of the characters on your screen, as well as the background. It also lets you toggle between regular letters or boldface letters. A proportional spacing character set is also available from that menu.

When you tell *Wiz* you want to go out to the OS-9 shell and do something else, it opens up a dialog window in the middle of your screen. When you return from the shell, your original screen is restored. Incidentally, the event window at the bottom of the screen that is used for conferencing and messages is a device window, as is the main screen. The menus are output to overlay windows.

The status bar at the top of the screen is a pseudo-window. To create it, Brady first created a window that filled the full size of the screen. Then, he wrote out the status bar and resized the main window so it is one line smaller and

---

Two-Liner Contest Winner . . .

Run this program if you would like a little help in setting the baud rate for your printer.

The listing:

```
10 CLS:PRINTTAB(6)"PRINTER BAUD
RATE":PRINT:PRINT" 1 =   50"," 9
 = 1800"," 2 =   75","10 = 2000"
," 3 =  110","11 = 2400"," 4 =
135","12 = 3600"," 5 =  150","13
 = 4800"," 6 =  300","14 = 7200"
," 7 =  600","15 = 9600"," 8 = 1
200":PRINT
20 INPUT"ENTER CHOICE (1-15)";Z:
IF Z<1 OR Z>15 THEN 10 ELSE Z$="
40882227124611531110018000880040
00250023001800100007000300001":PO
KE 149,VAL(MID$(Z$,Z*4-3,1)):POK
E 150,VAL(MID$(Z$,Z*4-2,3)):PRIN
T"BAUD RATE NOW SET"
```

Michael Kromeke
Albuquerque, NM

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

Two-Liner Contest Winner . . .

This Two-Liner will print out `PRINT@` worksheets for you.

The listing:

```
1 INPUT"# OF WORKSHEETS";N:FORZ=
1 TO N:PRINT#-2,TAB(19);"PRINT @
 WORKSHEET (32 X 16)":PRINT#-2:P
RINT#-2,TAB(23);:FORX=1 TO 2:T=T
+1:FORY=1 TO 10:PRINT#-2,USING"#
#";T;:NEXTY,X:PRINT#-2," 3 3 ":P
RINT#-2,CHR$(15);:FORX=1 TO 3:FO
RY=0TO9:PRINT#-2,TAB(4);
2 PRINT#-2,USING"##";Y;:NEXTY,X:
PRINT#-2," 0 1 ":FORY=1 TO 16:PR
INT#-2,USING"###";H;:PRINT#-2,"!
";:H=H+32:FORX=1 TO 32:PRINT#-2,
" !";:NEXTX:PRINT#-2:NEXTY:PRINT
#-2,CHR$(14):T=0:H=0:NEXTZ
```

Bobby Greene
Lenoir, NC

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape.*)

starts one line down. Since the status bar is outside of the main window, it remains on your screen.

Another trick Brady learned while programming *Wiz* was how to draw a border around an overlay window. To make his bevelled borders, he created a bevelled border sized to work with a 640-by-192 pixel screen. He found that after he did this, he could open any size window and write the same code to it. The system then automatically scales the border to the window. In the words of Bill Brady, "Microware did a beautiful job on this thing!"

WizDraw Listing

Bill Brady is so excited about the new windowing environment, he is sharing the module that draws the *Wiz* start-up screen. This way you can see how easy high resolution graphics can become with BASIC09 under OS-9 Level II.

There's an important time- and space-saving feature built into Brady's code. He makes full use of BASIC09's ability to create special data types. In *WizDraw*, he creates a data type that defines a box and a line, and another that allows him to move OS-9's high resolution graphics cursor anywhere on the screen.

We'll use Brady's definition of the data type `lx` to show the advantages of this approach. The data type `lx` has six parts. Each part is one byte long.

```
TYPE lx=olx,tlx,hbx.lbx,
 hby,lby:BYTE
```

After using the BASIC09 `TYPE` statement to define his data, Brady uses the `DIM` statement to actually reserve the memory for his program to use: `DIM line:lx`. This line tells BASIC09 to reserve six bytes of memory — one for each of the six-byte fields in the new data type `lx`. Next, Brady assigns a value of decimal 27 to the field named `olx` and a value of $46 to the field named `tlx`.

If you look on pages 4 through 9 of the windowing section of the OS-9 Level II manual, you will find an OS-9 drawing command named `LineM`. `LineM` means, "Draw a line and move." It draws a line, using the current foreground color, from the current draw pointer position to a new point. To send that command to OS-9 so a line can be displayed on your screen, you could simply use the standard display utility command, `OS9: display 1b 46 HBX LBX HBY LBY`.

Deja vu! Where have you seen the `1b` and `46` before? Didn't Brady assign those values to the `olx` and `tlx` fields of his new data structure? Read `HBX` as high byte of the X coordinate and `LBX` as low byte of the X coordinate. Read the values for the Y position in a similar manner.

To use this command from the OS-9 shell, you need to know the integer — two bytes wide — value of the end of the line. For example, on a screen 640 decimal pixels wide by 192 decimal pixels high, the middle of the screen would have an X coordinate of 320 and a Y coordinate of 96. That same position would be 140, 60 using hexadecimal notation. Remember the display utility command speaks Hex.

To draw a line from the upper left-hand corner of the screen, position 0 horizontal and 0 vertical, you would type: `OS9: display 1b 46 01 40 00 60` ENTER.

Notice you sent six bytes to the standard output path when you ran this line. When you did, a line popped onto your Color Computer screen. You must be in a graphics screen before this command line will work. We'll show you a procedure file named `MakeGW` You can use this file to turn your current window into a graphics window later.

You can also draw lines on your screen using the BASIC09 `GFX2 LINE` function. If you look at the definition of this function, you will see it accepts an optional path number, the word "LINE" and either two- or four-integer (or two-byte) parameters.

If you use two parameters, the `LINE` function will draw the line from the current graphics cursor position to the new position. If you give it four parameters, `LINE` will draw the line between the optional beginning X and Y coordinates and the ending coordinates. Assuming the graphics cursor is located in the upper left-hand corner of the screen, position 0, 0 again, you can draw the same line from within BASIC09: `RUN GFX2("LINE", 320,96)`. Notice that this time we used decimal numbers as coordinates. That's what the `LINE` function wants to see.

For now, let's continue to look at how Brady makes good use of BASIC09's ability to `GET` and `PUT` complete data structures with a single command. After he assigns the values to the `olx` and `tlx` fields, he makes similar definitions in his `rbox` and `putgc` data structures. `Rbox` is used to draw a box with one swift command. `Putgc` moves the cursor with the same speed and agility.

He is using assignment statements to place the proper control codes in the first two positions of his data structures and to pass coordinate information to his data structures. The codes he is using are the same codes you would send using the OS-9 `display` utility command. The coordinates define the position of the corners of the box, the new

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end of the line or the new position of the cursor.

Once he has stored all this information in the data structure, Brady sends those data structures intact to the standard output path, which just happens to be your screen. For example:

```
putgc.oxy=$1b
putgc.txy=$40
putgc.hxyx=0
putgc.lxyx=200
putgc.hxyy=0
putgc.lxyy=12
PUT #1,putgc
```

These BASIC09 statements move the draw pointer to a position 200 pixels to the right of the left edge of the screen and 12 pixel positions down from the top of the screen. This is the first cursor movement in the program. The next magic command out of the hat? `PUT #1, rbox`.

This draws a "relative" box with one corner on the starting position above and the opposite corner located 20 pixels to the right and 60 pixels down. From there, Brady moves the cursor just inside the box and sends out the command to fill the box with the current foreground color. Then, he moves the cursor again before drawing a number of lines one after the other. Each line begins where the last one ended. In about a second, a giant *Wiz* logo is drawn on your screen.

Instead of typing a series of shell display statements in his BASIC09 program, Brady has sent out his code with a simple `PUT` statement. He also saves 8K of memory in the process because every time you create a new shell to run a process, you use up one 8K block of data memory, albeit temporarily.

Creating a Graphics Window

To create a graphics window in place of the text window, you must send out a sequence of OS-9 display commands. Essentially, these commands must end the window you are using, set the type of the new window you want to use and then select that new window for use.

Create the following OS-9 procedure file with the `build` utility command or your editor, and then run it when you want to change in place from a text window to a graphics window. The characters appear to be a little sharper in the text windows — like the one created on device `/w7` by the procedure file `window.t80s` that comes on your Level II system disk — than they do in the graphics windows. Here is `MakeGW`.

```
merge /d0/sys/stdfonts
montype r
display 1b 24
display 1b 20 5 0 0 50 18
1 0 0
display 1b 31 1 0
display 1b 3a C8 01
display 1b 21
```

This procedure file will create an 80-by-24 white screen with black letters. The display commands are actually calls to the following OS-9 functions:

`DWEnd`	`Device Window End`
`DWSet`	`Device Window Set`
`Palette`	`Change Palette`
`Font`	`Select Font`
`Select`	`Window Select`

The Magic of /dd

One great new feature in the OS-9 Level II release is the device descriptor `/dd`. The "dd" stands for default drive. Microware and Tandy obviously intend for all software developers to use this device descriptor when they must hard code a pathlist into a program.

When you boot your OS-9 Level II system, the device descriptor is merely a copy of the standard `/d0` device descriptor that is also present.

Who cares, you might ask. You will — soon! Follow this scenario that actually happened to me. Immediately after booting my new OS-9 Level II system, I created a new boot file. This file contained `/d0` and `/d1` device descriptors set at 40 tracks, double-sided with a step rate of 6 ms. I left `/dd` in the boot file, not even noticing it was there.

Later, I encountered a new error number while creating new windows. I immediately typed `ERROR 192` and waited for the system to tell me what I had done wrong. No such luck! I got a message that said I couldn't open a path to `/dd/sys/errmsg`.

I wondered for a second, then I got the picture. The disk that now contained my system and `errmsgs` was a double-sided disk. The default drive, `/dd`, was still set to look like the original `/d0`, a single-sided, 35-track affair. When the `error` utility command tried to read the `errmsg` file from the `SYS` directory on my double-sided disk, it couldn't access it. Foiled, but protected at the same time.

After I got my Disto hard disk drivers installed in my Level II system, I made a copy of the `/h0` device descriptor and patched it so the module it contained was named `/dd`. I verified it to update the CRC and then used `OS9Gen` to generate a new `OS9Boot` file with my new `/dd` replacing the original.

I had already copied the `errmsgs` into the `SYS` directory on the hard disk drive. The next time I hit an error message I typed the `error` utility command again. This time, the hard disk started clicking and, a second later, the system reported the English language version of the sin I had committed.

Now, as soon as all developers start using `/dd/defs/defsfiles` instead of `/d0/defs/defsfiles`, etc., we will have it made. By the way, if you have a RAM disk instead of a hard disk, you can create a default device descriptor, `/dd`, that points to your RAM disk. Then, if you put your `SYS` directory in your RAM disk, the `error` utility command will respond almost instantaneously. So will the `help` utility command.

In summary, the default device descriptor `/dd` is nothing more than a copy of the device descriptor for the drive where you would like to store things that must always be found.

Here's another point. Using my current system as an example, `/dd` is nothing more than a copy of `/h0`. Both `/dd` and `/h0` are still in the boot file, and both can be used to access that single piece of hardware. Since both device descriptors have the same drive number and the same address with only the name changed, there are no collisions.

If we all come behind this Microware standard and create a few standard default directory names of our own, it

Listing 1: `wizdraw`

```
PROCEDURE wizdraw
0000        TYPE bx=obx,tbx,hbbx,lbbx,hbby,lbby:BYTE
001F        TYPE putxy=oxy,txy,hxyx,lxyx,hxyy,lxyy:BYTE
003E        TYPE lx=olx,tlx,hbx,lbx,hby,lby:BYTE
005D        DIM ffil:STRING[2]
0069        DIM rbox:bx
0072        DIM putgc:putxy
007B        DIM line:lx
```

may someday be much easier to write programs that can be used easily — no matter where your current data directory is located. It won't make any difference if we are using a 40-track, double-sided floppy disk, a RAM disk, an 80-track quad-density floppy or a hard disk drive — if our programs look in `/dd/sys/errmsg` for English language messages they will find them, *if* we have copied the `sys/errmsg` file to that medium.

How To Use *ModPatch*

The same day we received our OS-9 Level II package we got a call from Cray Augsburg of Delphi RAINBOWMAG fame. Cray had received his package, too, and wanted to know how to patch his device descriptors to pick up a six millisecond step rate. He had already used `config` to make a new `OS9Boot` file that let him use his double-sided drives.

For some reason, I couldn't find the *ModPatch* directions in the thick manual that comes with Level II, so I typed `help modpatch` and picked up enough of the syntax to do the job.

ModPatch reads a file containing the patches you want to make, to a module in memory. The patch file I sent to Cray on Delphi looked like this:

```
L d0
C 14 00 03
V
L d1
C 14 00 03
V
```

That file will take care of both `/d0` and `/d1`. It links to the device descriptor in the first line. In the second line, it changes the byte at an offset 14 Hex bytes from the beginning of the file from 00 to 03. This changes the step rate from 30 milliseconds to six milliseconds. The official name of that byte in a device descriptor is `IT.STP`.

To actually make the patch after he downloaded the listing into a file named `patch`, Cray typed: `ModPatch patch` ENTER.

And while we're speaking of patches, if you have any device descriptors you are upgrading to Level II, you need to change the byte at an offset of 14 decimal from FF to 07. To do it, create a *ModPatch* patch file like this:

```
L H0
C 0E FF 07
V
```

That's all there is to it!

```
0084       putgc.oxy=27 \putgc.txy=$40
009B       line.olx=27 \line.tlx=$46
00B2       ffil=CHR$(27)+CHR$($4F)
00BF       rbox.obx=27
00CA       rbox.tbx=$49
00D6       rbox.hbbx=0
00E1       rbox.lbbx=20
00EC       rbox.hbby=0
00F7       rbox.lbby=60
0102       PRINT CHR$($0C);
0109       putgc.hxyx=0 \putgc.lxyx=200 \putgc.hxyy=0 \putgc.lxyy=12
0135       PUT #1,putgc
013E       PUT #1,rbox
0147       putgc.lxyx=202 \putgc.lxyy=13
015D       PUT #1,putgc
0166       PUT #1,ffil
016F       putgc.lxyx=220
017A       putgc.lxyy=72
0185       PUT #1,putgc
018E       line.hbx=1 \line.hby=0
01A4       line.lbx=$18 \line.lby=72
01BB       PUT #1,line
01C4       line.hbx=1
01CF       line.lbx=$2C \line.lby=62
01E6       PUT #1,line
01EF       line.lby=12
01FA       PUT #1,line
0203       line.lbx=26
020E       PUT #1,line
0217       line.lby=68
0222       PUT #1,line
022B       line.lby=70 \line.lbx=$18
0242       PUT #1,line
024B       line.lbx=6
0256       PUT #1,line
025F       line.lby=12
026A       PUT #1,line
0273       line.hbx=0 \line.lbx=$F1
028A       PUT #1,line
0293       line.lby=70
029E       PUT #1,line
02A7       line.lbx=220
02B2       PUT #1,line
02BB       putgc.lxyx=222
02C6       putgc.lxyy=71
02D1       PUT #1,putgc
02DA       PUT #1,ffil
02E3       putgc.hxyx=1 \putgc.lxyx=$20
02FA       putgc.lxyy=14
0305       PUT #1,putgc
030E       PUT #1,ffil
0317       putgc.hxyx=1 \putgc.lxyx=$40 \putgc.lxyy=12
0339       rbox.lbbx=20 \rbox.lbby=5
034F       PUT #1,putgc
0358       PUT #1,rbox
0361       putgc.lxyx=$41 \putgc.lxyy=13
0378       PUT #1,putgc
0381       PUT #1,ffil
038A       putgc.lxyy=24
0395       putgc.lxyx=$40
03A1       PUT #1,putgc
03AA       rbox.lbby=48
03B5       PUT #1,rbox
```

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```
      03BE        putgc.lxyy=25 \putgc.lxyx=$41
      03D5        PUT #1,putgc
      03DE        PUT #1,ffil
      03E7        putgc.lxyx=$68 \putgc.lxyy=24
      03FE        PUT #1,putgc
      0407        line.hbx=1 \line.lbx=$B8
      041E        line.hby=0
      0429        line.lby=24
      0434        PUT #1,line
      043D        line.lby=34
      0448        PUT #1,line
      0451        line.lby=70
      045C        line.lbx=$70
      0468        PUT #1,line
      0471        line.lbx=$B8
      047D        PUT #1,line
      0486        line.lby=72
      0491        PUT #1,line
      049A        line.lbx=$68
      04A6        PUT #1,line
      04AF        line.lby=62
      04BA        PUT #1,line
      04C3        line.lby=26 \line.lbx=$B0
      04DA        PUT #1,line
      04E3        line.lbx=$68
      04EF        PUT #1,line
      04F8        line.lby=24
      0503        PUT #1,line
      050C        putgc.lxyx=$90 \putgc.lxyy=48
      0523        PUT #1,putgc
      052C        PUT #1,ffil
      0535        END
```

Listing 2: `xmode`

```
/*
 * modified xmode utility to allow changing IT.Col and IT.Row
 * in the device descriptor.
 *
 * Copyright (c) 1986 by Gregory A. Law
 */

#include <ctype.h>
#include <module.h>

#define DIGHEX(x)     ((x) <= '9' ? (x) - '0' : toupper(x)-'A' + 0x0a)
#define TRUE          1

/*
 * pointer to the options section of the device descriptor
 */

struct {
     char        dvc, upc, bso, dlo, eko, alf, nul, pau, pag,
                 bsp, del, eor, eof, rpr, dup, psc, abort, quit,
                 bse, ovf, par, bau;
     unsigned    d2p;
     char        xon, xoff, col, row;
} *Opts;

main(argc, argv)
int  argc;
char *argv[];
{
     char        *Module;        /* pointer to the descriptor */
     unsigned    Address;        /* address of the descriptor */
     unsigned    *Length;        /* size of the descriptor */
     unsigned    *PortAddr;      /* pointer to the port address */
     char        *ModCrc;        /* pointer to the CRC bytes */
     char        *NamePtr;       /* pointer to the module name */
     int         Modified = 0;   /* modified flag */
     int         i;

     NamePtr = argv[1];                     /* point to the module name */
     if(NamePtr[0] == '/')                  /* if the name contains a slash */
          NamePtr[0] = ' ';                 /* simply strip it out */

     Module = modlink(NamePtr, 0, 0);       /* link the descriptor */
     if (Module == -1)                      /* if there is an error */
          exit(221);                        /* exit with an error */

     PortAddr = Module + 0x0f;              /* point to the port address */
     Opts = Module + 0x12;                  /* set the structure pointer */

     if(argc > 2) {                         /* if there are command line options */
          Modified = 1;                     /* set the modified flag */
          for (i = 2; i < argc; i++)        /* do for each command line word */
               parse(argv[i]);              /* run through the parsing routine */
     }

     if (! Modified) {
          printf("Port address=%04X\n", *PortAddr);
```

New Level II Utility Programs From Kevin Darling

Kevin Darling has uploaded a set of OS-9 Level II utility programs to both the RAINBOW Delphi OS-9 Online SIG and the CompuServe OS-9 SIG. They take CoCo OS-9 Level II memory management techniques into consideration and are stored in one file just under 8K bytes long. The package includes `proc`, a `procs`-like utility that also reports the standard input and output devices for each process; `dirm`, an `mdir` replacement that prints true block numbers and a tick mark on the left side of the first module name loaded from a file; `mmap`, which prints a memory block map that shows where modules are loaded, data is being stored or is free; `smap`, which shows the layout of memory in the system page; `pmap`, which shows process DAT image maps and tells which process is using each block; and `dmem`, which can be used to write up to 1,024 bytes of data from a specified memory block to the standard output path. These utilities make a nice addition to your OS-9 toolkit.

DeskMate Tip From Color Expo

We interviewed two of the Color Computer Community's movers and shakers, Dale Lear and Paul Searby, at Color Expo '87. We talked to Dale about a new way to use the *VShell* program built into his *TSWord* package. Look for it in the next column. We'll also feature Lear in a short personality profile.

Paul Searby was so busy demonstrating Computerware's new *Screen Star* program at Anaheim, we barely caught him for the interview. The new *WordStar*-like program works with either Level I or Level II OS-9. The Level II version takes advantage of the CoCo 3's ALT and function keys. It uses the Level II dialog windows to create pop-up menus and features a "smart speller" that uses a dictionary containing the most common misspellings in the English language.

Searby has been a staunch supporter of OS-9 for more than five years. Next month, we'll feature a few of his views about OS-9 Level II and the future of the CoCo 3.

After our OS-9 presentation at Color Expo '87, we got into a long conversation with John Alan Lind, KD7XG, the Orange Section Technical Coordinator of the American Radio Relay League. Lind had solved a *DeskMate* printing problem that has plagued many users. He shared his solution with us.

One of the main problems with *DeskMate* is that it only supports two baud rates, 600 and 1200. The baud rate is set by using the ALT-* keystroke pair and by selecting the printer icon that appears at the top of the screen. At the end of this process, you are asked to select between 600 and 1200 baud.

Resetting the default baud rate for the printer device descriptor, `/p`, using `xmode` and `cobbler` will not work. *DeskMate* "conveniently" resets the baud value right back to 600 with its own embedded version of `xmode`. The `tuneport` utility gave Lind a tool to solve the problem.

It works at a lower level in the descriptor than `xmode` and resets the actual timing loop value for the baud rate selected. It allows gross as well as fine tuning, and Lind decided to set the 1200 baud timing loop so it would actually print at 2400 baud. He figured, accurately, that if he could do this, he would be able to make the 1200 baud selection to print at 2400 baud.

First, load `xmode`, `tuneport` and `cobbler` into memory from your OS-9 system disk. Then, replace your system disk with the *DeskMate* disk and run the sequence below. Remember, the *DeskMate* disk is the one you want mounted at this time, because it is the one you are changing.

You must make sure your printer is connected. If it isn't, `tuneport` won't work. If you forget, you'll see an "Error #246" message. Also, make sure your printer is set to the baud rate you want to use. Now type:

```
OS9: chx d0/cmds
OS9: xmode /p baud=03
```

This sets `/p` to the 1200 baud rate. If you want to retune the 600 baud selection, you must use `xmode /p baud=02`.

Now type: `OS9: tuneport /p -s=45`. `tuneport` will have you verify that you have indeed used the correct timing loop value. If the test message is printed OK, just press the ENTER key. If not, fine tune the delay by entering a new value close to 45.

After you have run `tuneport`, use `cobbler` to rewrite the `OS9Boot` file on your *DeskMate* disk: `OS9: cobbler /d0` ENTER.

That's it! The next time you select 1200 baud in *DeskMate*, the program will use `xmode baud=03`. Since you have set the timing loop at `baud=03` to 2400

```
          printf("%s ", Opts->upc == 0 ? "-upc" : "upc");
          printf("%s ", Opts->bso == 0 ? "-bsb" : "bsb");
          printf("%s ", Opts->dlo == 0 ? "-bsl" : "bsl");
          printf("%s ", Opts->eko == 0 ? "-echo" : "echo");
          printf("%s ", Opts->alf == 0 ? "-lf" : "lf");
          printf("nulls=%X ", (unsigned) Opts->nul);
          printf("%s ", Opts->pau == 0 ? "-pause" : "pause");
          printf("pag=%d ", (unsigned) Opts->pag);
          printf("bsb=%02X\n", (unsigned) Opts->bsp);

          printf("del=%02X ", (unsigned) Opts->del);
          printf("eor=%02X ", (unsigned) Opts->eor);
          printf("eof=%02X ", (unsigned) Opts->eof);
          printf("reprint=%02X ", (unsigned) Opts->rpr);
          printf("dup=%02X ", (unsigned) Opts->dup);
          printf("psc=%02X ", (unsigned) Opts->psc);
          printf("abort=%02X\n", (unsigned) Opts->abort);

          printf("quite=%02X ", (unsigned) Opts->quit);
          printf("bse=%02X ", (unsigned) Opts->bse);
          printf("bell=%02X ", (unsigned) Opts->ovf);
          printf("type=%02X ", (unsigned) Opts->par & 0xff);
          printf("baud=%02X ", (unsigned) Opts->bau);
          printf("xon=%02X ", (unsigned) Opts->xon);
          printf("xoff=%02X\n", (unsigned) Opts->xoff);

          printf("col=%d ", (unsigned) Opts->col);
          printf("row=%d\n", (unsigned) Opts->row);
     }

     /*
      * this routine updates the CRC of the descriptor
      */

     if (Modified) {
          Address = Module;
          Length = Address + 2;
          ModCrc = Module + (*Length) - 3;
          ModCrc[0] = ModCrc[1] = ModCrc[2] = 0xff;
          crc(Module, *Length - 3, ModCrc);
          ModCrc[0] = ~ModCrc[0];
          ModCrc[1] = ~ModCrc[1];
          ModCrc[2] = ~ModCrc[2];
     }
     munlink(Module);                   /* finally, restore the link count */
}

/*
 * This is a  quick and dirty parsing routine using strcmp() to
 * compare the input string with a know flag. It could have been
 * smaller but at the time I was too lazy to write the real
 * parsing routine and parsing tables. After all, are not macros
 * easier to type?
 */
parse(command)
char command[];
{
     int  i;
     char value;

     for (i = 0; i <= strlen(command); i++)
          command[i] = tolower(command[i]);
      if (! strcmp(command, "upc"))
           Opts->upc = 1;

      if (! strcmp(command, "-upc"))
           Opts->upc = 0;

      if (! strcmp(command, "bsb"))
           Opts->bso = 1;

      if (! strcmp(command, "-bsb"))
           Opts->bso = 0;

      if (! strcmp(command, "bsl"))
           Opts->dlo = 1;

      if (! strcmp(command, "-bsl"))
           Opts->dlo = 0;

      if (! strcmp(command, "echo"))
           Opts->eko = 1;

      if (! strcmp(command, "-echo"))
           Opts->eko = 0;

      if (! strcmp(command, "lf"))
           Opts->alf = 1;

      if (! strcmp(command, "-lf"))
           Opts->alf = 0;

      if (! strcmp(command, "pause"))
           Opts->pau = 1;

      if (! strcmp(command, "-pause"))
           Opts->pau = 0;
```

```
        if (! strncmp(command, "null=", 5))
             Opts->nul = tohex(command) & 0xff;

        if (! strncmp(command, "pag=", 4))
             Opts->pag = toint(command) & 0xff;

        if (! strncmp(command, "bsp=", 4))
             Opts->bsp = tohex(command) & 0xff;

        if (! strncmp(command, "del=", 4))
             Opts->del = tohex(command) & 0xff;

        if (! strncmp(command, "eor=", 4))
             Opts->eor = tohex(command) & 0xff;

        if (! strncmp(command, "eof=", 4))
             Opts->eof = tohex(command) & 0xff;

        if (! strncmp(command, "reprint=", 8))
             Opts->rpr = tohex(command) & 0xff;

        if (! strncmp(command, "dup=", 4))
             Opts->dup = tohex(command) & 0xff;

        if (! strncmp(command, "psc=", 4))
             Opts->psc = tohex(command) & 0xff;

        if (! strncmp(command, "abort=", 6))
             Opts->abort = tohex(command) & 0xff;

        if (! strncmp(command, "quit=", 5))
             Opts->quit = tohex(command) & 0xff;

        if (! strncmp(command, "bse=", 4))
             Opts->bse = tohex(command) & 0xff;

        if (! strncmp(command, "bell=", 5))
             Opts->ovf = tohex(command) & 0xff;

        if (! strncmp(command, "type=", 5))
             Opts->par = tohex(command) & 0xff;

        if (! strncmp(command, "baud=", 5))
             Opts->bau = tohex(command) & 0xff;

        if (! strncmp(command, "xon=", 4))
             Opts->xon = tohex(command) & 0xff;

        if (! strncmp(command, "xoff=", 5))
             Opts->xoff = tohex(command) & 0xff;

        if (! strncmp(command, "col=", 4))
             Opts->col = toint(command) & 0xff;

        if (! strncmp(command, "row=", 4))
             Opts->row = toint(command) & 0xff;
   }

   /*
    * This routine converts an ASCII hex value into a hex int value
    * using DIGHEX found in the above #define.  Note, if the value
    * is preceeded by a '%' (ie, eof=%xx) then it will convert
    * a binary value to hex int.
    */

   tohex(line)
   char line[];
   {
        char *ptr;
        int  value;

        ptr = line;
        while(*ptr != '=')         /* search for the '=' until found */
             ptr++;                /* trying the next char until done */
        ptr++;                     /* now point to one beyond the '=' */

        if(ptr[0] == '%')          /* is it a bin specifier */
             return(tobin(ptr)); /* yes, do binary instead */

        while(*ptr) {              /* process each digit there */
             value = (value << 4) + DIGHEX(*ptr); /* shift left nibbles */
             ptr++;                /* point to the next character */
        }

     return(value);             /* return the value calculated */
}

/*
 * This routine converts an ASCII decimal value to hex int via
 * atoi() as found in the C Library.  Note that "pag", "col"
 * and "row" MUST be set using only integer values.
 */

toint(line)
char line[];
{
     char *ptr;

     ptr = line;
```

baud, *Deskmate* will print at 2400 baud. Makes sense.

"It took me a week to figure out how to fool *DeskMate* with this patch," Lind said. "I was really frustrated that the authors didn't allow me to select a higher baud rate but was happy to be able to work it out."

If you're an amateur radio operator, here's more good news. Lind is busy porting the WA7MBL packet BBS system into OS-9 C for the CoCo.

D.P. Johnson's 512K Memory Upgrade

Dan Johnson, of SDisk driver fame, was wearing bells at his Color Expo '87 booth with Hemphill Electronics, Inc. He sold several dozen Plus-100 512K memory upgrades to CoCo 3 owners. The board uses prime, factory-fresh 120-nanosecond chips and gold plated connectors. It is the first CoCo upgrade board I have seen that uses the new zigzag package chips. The new chips give you the smallest overall board size, the shortest data paths and superior decoupling.

Johnson and his partner were also demonstrating their new Vanguard PD1 OS-9 Level I microcomputer. The PD1 uses a 6809E running at 2 megahertz and sports three serial ports, a modem port, a centronics printer port and a real-time clock with a front panel LED display. A 450K RAM disk is standard. It uses two dual-speed drives that can read single- or double-sided, 35-, 40- or 80-track single-, double- or high-density disks in either standard OS-9, Radio Shack, Mizar or Fujitsu formats. It can also read and write IBM PC disks. The high density mode gives you a total storage of more than two million bytes and a data transfer rate of 500 kilobits per second. The whole thing is about the size of a lunch box.

Color America Notes

One of the fine people we met at Color Expo '87 was Jack W. Eizenga, the software exchange librarian for Color America. The club now has several public domain disks in its library. Included in the selection are several RS-232 pack drivers, a terminal program, Steve Bjork's bouncing ball demo programs, several files containing OS-9 patch information, a set of OS-9 tutorials Jack wrote and a Bulletin Board System written in BASIC09. If you have programs you would like to contribute to their efforts in Southern California or would like to join Color America, write to Eizenga at 3811

North Foster Ave., Baldwin Park, CA 91706. We put him in touch with Carl Kreider, the new OS-9 Users Group software librarian.

Sanford Sends Bouquet for Owlware

In today's negative world, it does my heart good to see a positive note occasionally. One such note came in a letter from James A. Sanford of Hampton, Virginia.

"A large bouquet to Owl Services," Sanford writes. "Tom called me back several times and spent quite a bit of time on the phone answering detailed questions about their system. When I got it, it had been 100 percent tested and worked fine."

While on both CompuServe and Delphi, I noticed that the L R Tech hard disk system from Owl Services was one of the first ones up and running on OS-9 Level II. Good going guys!

This Month's Listings

Wizdraw from Bill Brady forms the heart of our tutorial this month.

From Greg Law, is an English language `xmode`, which is a little more flexible than the standard version. It gives you the port address and an understandable listing of the defaults for the descriptor in question.

Dennis Duke of Bessemer, Alabama, is back with this utility that takes input from the standard input path and sends out 16 hexadecimal characters per line on the standard output path. It prints the Hex representation above the ASCII representation of each byte.

Finally, a Reader's Challenge

Robert Parsons of Blackfoot, Idaho, had an idea.

"Quite a few years ago, another magazine came out with an article that showed how to build an organ. Then, for months they featured articles with enhancements that added to the organ," Parsons said. "By initiating the same thing to programming for the CoCo 3 under OS-9 Level II, we could come up with a program like *CoCo Max 3* for OS-9.

"The program could be written a module at a time by RAINBOW readers and the RAINBOW staff and submitted through 'KISSable OS-9'," Parsons continued. "I believe that writing modules for main programs in this manner would boost the interest in using OS-9."

Let me know what you think. Who will write the first module? Time will tell. See you in June. ☐

```
     while(! isdigit(*ptr))    /* search through the line finding the decimal */
          ptr++;               /* value that should follow '=' */
     return(atoi(ptr));        /* now tell C to convert it and return value */
}

/*
 * This routine converts an ASCII binary value into a hex int.
 */

tobin(line)
char line[];
{
     int  i;
     int  j[8];
     int  value = 0;

     for (i = 0; i <= 7; i++) {                          /* repeat for 8 values */
          j[i] = ((line[i+1] == '1') ? 1 : 0);           /* convert ASCII to dec */
          value = (value << 1) + j[i];                   /* shift value left + j */
     }
     return(value);
}
```

Listing 3: `hexdump`

```
char modid[] = "@(#)hexdump.c          1.0";

/*   --------- OS-9 utility ----------- hexdump ---------
 *
 *             by Dennis J. Duke
 *                Bessemer, Al.
 *                31 October 86
 *
 *        Read a file and dump it in hex
 */

# include      <stdio.h>
# include      <ctype.h>

int     c, i, j = 0;
char    holdit1[16][2], holdit2[16][2];
char    hold1[2], hold2[2];

main()
{
    while((c = getchar()) != EOF) {
        /* Convert the input integer to an ascii char. */
        hold1[0] = toascii(c);

        /* Eliminate non-printable chars by replacing them with a '.' */
        if(c < 32 || c > 126)
            c = 46;
        /* Convert this integer to an ascii char. */
        hold2[0] = toascii(c);

        /* Copy these chars. to a holding area */
        if(j < 16)
            copyit();
        else {
            /* Print the output */
            printit();
            printf("\n\n");
            /* Start the next string */
            j = 0;
            copyit();
        }
    }
    /* Finish up whatever is left over */
    printit();
    putchar('\n');
}


copyit()
{
    strcpy(holdit1[j], hold1);
    strcpy(holdit2[j], hold2);
    j ++;
}


printit()
{
    /* Print the chars. in hex */
    for(i = 0; i < j; i++)
        printf("%02x ", holdit1[i][0]);
    putchar('\n');
    /* Print the chars. in ascii */
    for(i = 0; i < j; i++)
        printf(" %s ", holdit2[i]);
}
```

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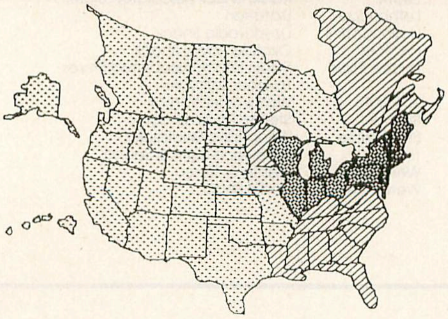

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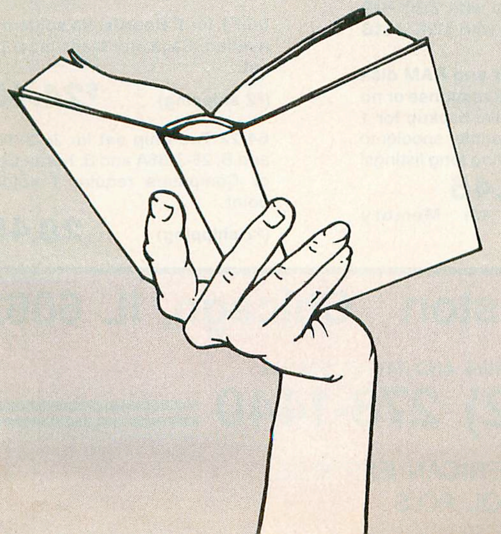

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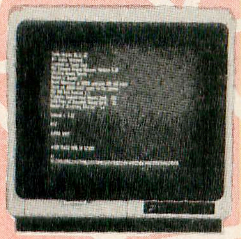


ZENITH

123A 12"

This 12" green screen high resolution monitor offers 80 column capability, Zenith quality and a 30-day warranty valid at any of Zenith's 1200 locations.

Retail $149
Our price
($7 shipping)

$67.50
REPACK

122A Zenith 12" Amber Screen offers the same 640 dots × 200 dots resolution at 15MHz as the 123A and a 90-day warranty valid at 1200 locations.

($7 shipping) **$88**

All monitors require an amplifier circuit to drive the monitor and are mounted inside the color computer. They attach with spring connectors with two wires extending out of the computer, one for audio and one for video. CoCo 3 does not require an amplifier circuit.

VA-1 for monochrome monitors only, fits all color computers

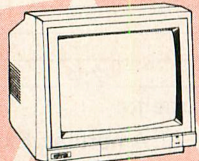
($2 shipping) **$24.45**

VC-4 for monochrome or color, fits all color computers
($2 shipping) **$39.45**

MAGNAVOX
8 CM 515 has

analog RGB for CoCo 3, TTL RGB for Tandy 1000 or IBM PC's, and composite color for CoCo 2 and 3. Built-in speaker. 14" screen with 640 dot × 240 line resolution. Plus 2 years parts and labor warranty.

reg. list $499



SAVE
$100

$298

+ $14 Shipping

CC-3 Magnavox RGB cable.

only $19.95 with
Magnavox Monitor order.
$29.95 w/o monitor.

MAGNAVOX
CM 8505 has analog

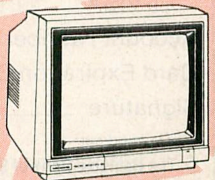
RGB and TTL RGB and composite color input. Built in speaker. 13" screen with 390 dots × 240 resolution in RGB mode. Plus 1 year parts & labor warranty.

reg. list $299

SAVE
$80

$220

+ $14 Shipping



DRIVE 0 +. Howards Drive 0 gives you a

DD-3 MPI drive, a CA-1 cable and a J&M DC-4 Disk Controller for only

$\$178^{45}$

($5 shipping)

Add $34 for a Disto DC-3.

DOUBLE SIDED
DOUBLE DENSITY
360K

GUARANTEE

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping.)

Shipping charges are for 48 states.
APO, Canada and Puerto Rico orders slightly higher.

DISK CONTROLLER

DISTO

Includes controller and C-DOS 4.0 ROM Chip.

$98 DC-3

$2 shipping on all DISTO products

ADD-ON BOARDS

DC-38 includes 80 column capacity, parallel printer, real time clock, and all software **$138**

DC-256 256K RAM Board includes software to access all RAM **$90**

DC512 512K RAM Board with software **$125**

DC-3C Clock Calendar and parallel printer port **$40**

DC-3P Mini Eprom programmer includes all software to program 2764 or 27128 chips **$55**

2764 8K Eprom 28 pin **$\$8^{50}$ each**

27128 16K Eprom 28 pin **$\$8^{50}$ each**

C-DOS 3 28 pin Eprom makes Disto controller compatible with CoCo 3 **$20**

SOFTWARE SPECIALS

Payrol/BAS™

($2 shipping)

- Nonprotected basic modifiable
- Tax tables built in for automatic state and federal calculation
- Custom code for every state
- 4 pay periods
- 7 deductions
- Prints checks
- 100 employees
- 30 ledger numbers for checks other than payroll
- Check register includes monthly or weekly federal deposit amount
- Enter, update, delete employees, company and check information
- Print payroll and nonpayroll checks

Payrol/BAS™
30 Day Trial

$79.95

VIP LIBRARY

Softlaw's integrated package includes VIP writer terminal, data base, call and disk zap which can fix a diskette that is giving I/O errors **$125**

($2 shipping)

MEMORY

Memory for CoCo 3 PC memory board plugs into the spare slots inside the computer and can be populated with 256K ram chips. Completely solderless with complete easy to install instructions.

$49.50

PC Memory board with 256K **$99**
PC Memory board with 512K **$118**

Software spooler and RAM disk for lightning quick response or no disk swapping drive backup for 1 drive system and printer spooler to free computer during long listings.

$19.45

($2 shipping on Memory products)

64-2 for CoCo 2. Kit requires one solder point, no trace cuts.
($2 shipping) **$24.45**

64-E1 for E Boards with complete instructions. Remove old chips and replace with preassembled package—no soldering or trace cuts.
($2 shipping) **28.45**

64-F1 for F Boards. No soldering needed. Capacitor leads must be cut.
($2 shipping) **$24.45**

64-22 Two chip set for 26-3134A and B, 26-3136A and B. Koren Color Computers require 1 solder point.
($2 shipping) **28.45**

Howard Medical Computers 1690 N. Elston Chicago, IL 60622

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FREEDOM

GRAMS
BLES
1983

". . . Freedom is nothing else but a chance to be better . . ."

— Albert Camus

*** Mental Freedom ***

for CoCo 1, 2 and 3!

A Thought-Controlled Video Challenge

We call it The Preble Thoughtware.

DOES GREEN BLOOD flow in your veins like Mr. Spock? Is your mind well ordered? Or is your mind a mass of conflicting emotions like most humans?

THOUGHTWARE may answer these questions and more.

IMAGINE! Some day, a computer so advanced that it responds to your very thoughts and emotions. Imagine, some day, thought-controlled graphics: levitation and materialization!

PLUG IN YOUR MIND and UNHOOK YOUR JOYSTICKS — that day is now! The Radio Shack Color Computer has many advanced capabilities, just waiting to be tapped. Dr. Preble's Programs combines the advanced technology of the CoCo with the amazing Radio Shack BIOFEEDBACK MONITOR to bring you "Preble Thoughtware."

THOUGHT-CONTROLLED VIDEO CHALLENGE? Unlike any video game you have ever played, Thoughtware tests your ability to handle stress, to remain calm under adverse circumstances.

LIGHTNING FAST reflexes will do you no good here, unless you first tame the fickle dragon of your mind.

DO YOU HAVE SELF-CONTROL? Many people can keep a "Poker Face" even when they are worried so that others may not notice; but can you really stop the worry itself? Thoughtware will find out!

AND IT TALKS! Did you know that the CoCo can produce incredibly realistic digital speech without a special speech synthesizer? And I mean really high quality speech! Forget the mechanical robot voice. This voice quality is so good, it sounds human! Honest. Best of all, no extra hardware is needed for speech. None. The CoCo produces this amazing digital speech all by itself (with a wee bit of programming by Dr. Preble).

THOUGHTWARE — Next time your friends ask what your computer can do, show them the Preble Thoughtware!

Requires Radio Shack's Biofeedback Monitor Catalogue #63-675

The Preble Thoughtware — TAPE $27.95 + s/h, on DISK $29.95 + s/h

DR. PREBLE'S
SINCE 1983
PROGRAMS

*** Basic Freedom ***

for The Color Computer 3
(with versions for CoCo 1 & 2)

A Full Screen Editor for BASIC Programming

We call it EDITOR 3. Chris Babcock wrote a pure, efficient Machine Language program to open a new dimension of ease and power for anyone typing in a BASIC program.

Here are your BASIC Freedoms!

FULL CURSOR MOVEMENT — Use the arrow keys to move anywhere on a screen. If you are using a Color Computer 3, then even the 40 or 80 column screen is supported!

INSERT, CHANGE or DELETE CHARACTERS anywhere on the screen. Simply move to what you wish to change, change it and continue working!

LOWERCASE COMMANDS are OK! EDITOR 3 lets you type in lowercase any time or all the time. Lowercase command words are automatically translated to uppercase for BASIC. Of course, lowercase text within quotes stays lowercase. This is great when typing wiht the CoCo 3's 40 or 80 column mode with true lowercase!

MERGE LINES within a program with just a few keystrokes!

AUTO KEY REPEAT — Hold down any key and it will repeat.

INVISIBLE — Once EDITOR 3 has been loaded in, it is activated with a single keystroke! It hides itself out of the way of other programs and can be turned off any any time. Pressing RESET will not hurt EDITOR 3!

EASY TO USE — Installation takes seconds! Well-written goof-proof manual included.

COCO 1 & 2 — Yes, even though this program was conceived for the powers of the new CoCo 3, we still support the previous Color Computers. They too, need their BASIC Freedom!

EDITOR 3 — So easy and handy, you'll never want to run your CoCo without it!

Available on DISK only for CoCo 3 @ $29.95 + s/h

CoCo 1/2 version can not support 40 or 80 column screens. CoCo 1/2 version is available on TAPE for $27.95 + s/h or DISK for $29.95 + s/h.

Also Available for CoCo 1 & 2 only:

VDOS, the UnDISK: Save multiple programs in memory! Works with or without a disk drive. TAPE $27.95 + s/h, DISK $29.95 + s/h

VDUMP, for the UnDISK: Save multiple programs in a single file! $14.95 + s/h on tape.

VPRINT, for the UnDISK: Printout UnDISK Directory! $9.95 + s/h on tape.

Check, Money Order, MasterCard, VISA or COD accepted. For Shipping to USA and Canada add $1.50, to other countries add $5.00.

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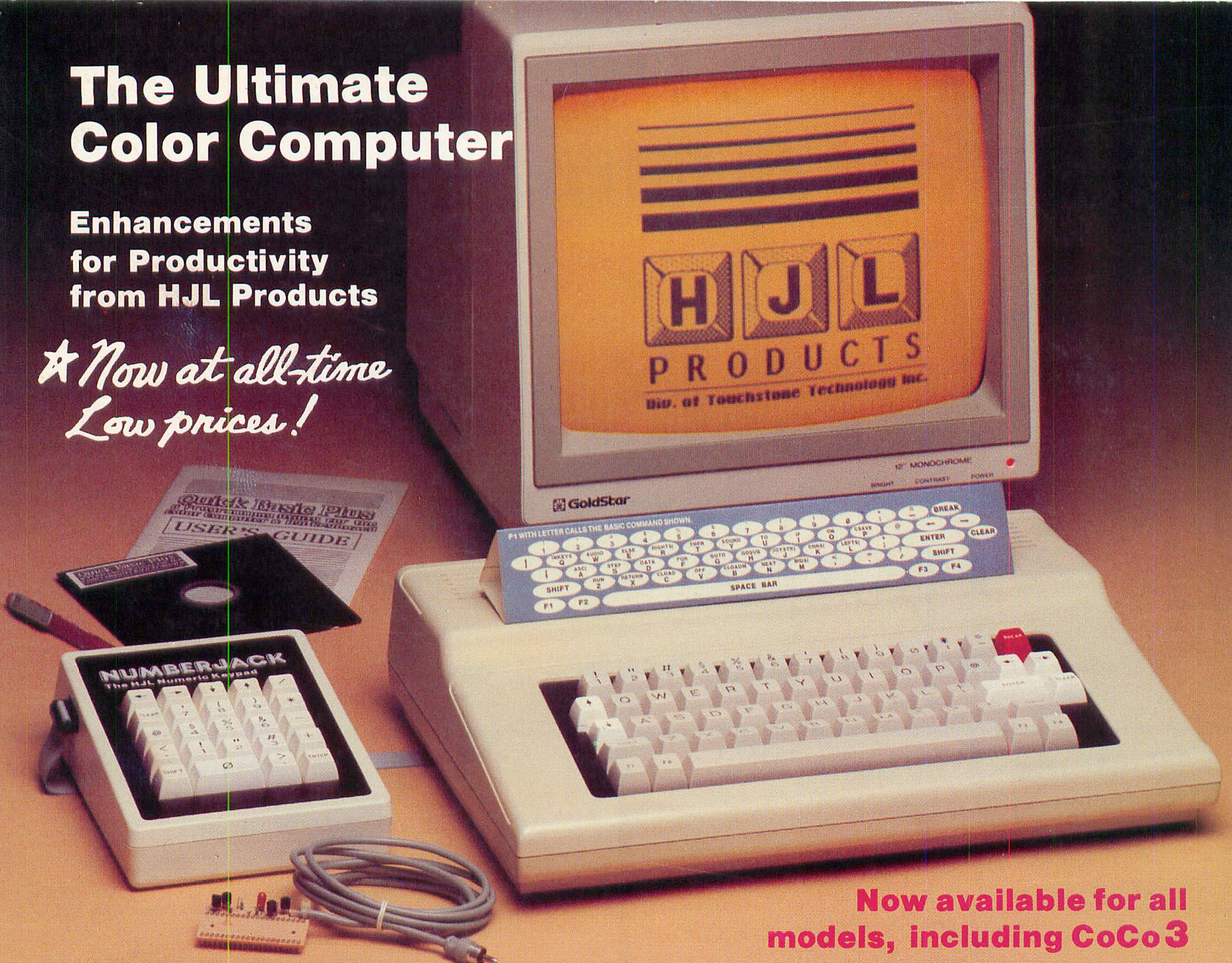

Now available for all models, including CoCo 3

To achieve maximum productivity with your Color Computer, you have to make it as easy as possible to get information into and out of the system.

This is why we developed the HJL family of high-performance enhancements for ALL MODELS of the Color Computer.

The Keyboard - ~~$79.95~~ ★ Now $59.95

The overwhelming favorite of serious Color Computer users worldwide, the HJL-57 keyboard has the smooth, consistent feel and reliability you need for maximum speed with minimum input errors. Includes 4 Function Keys and sample function key program. Installs in just a few minutes with no soldering.

The Numeric Keypad - ~~$89.95~~ ★ Now $59.95

The NumberJack is a self-contained, cable-connected keypad for heavy-duty number-crunchers. Besides the number keys, it has all the cursors, symbols and math keys, including autoshifted (one-touch) ADD and MULTIPLY. Comes complete with 3-foot cable and all necessary connectors for quick and easy installation without soldering.

The Monitor Adapter - $25.95

This universal driver works with all monochrome monitors, and is easily installed without clips, jumpers or soldering (except in some later CoCo 2s with soldered-in video chips). Here's crisp, clear, flicker-free monitor output with all the reliability you've come to expect from HJL Products.

The Monitor - $89.95

The GoldStar high-resolution amber monitor brings you the monochrome display that's preferred by most computer professionals today. Once you've used it you'll never connect your computer to a TV set again. The 12-inch diagonal CRT has an etched non-glare faceplate. (Requires adapter sold above)

The BASIC Utility - ~~$25.95~~ ★ Now $19.95

Quick Basic Plus, a high-performance programming utility, can be used with any color computer that has four function keys. 26 pre-defined BASIC statements, 10 user-defined macros at a time (you can save as many sets of macros as you like), automatic line-numbering, word wrap, global search, and instant screen dump to printer, make this software the BASIC programmer's dream come true. Comes with re-legendable 3-way reference chart. Specify disk or cassette.

The HJL Warranty

Every HJL product comes with a full, one-year warranty and the exclusive HJL 15-day unconditional guarantee (except software).

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Ordering Information: Specify model (Original, F-version, or CoCo 2 Model Number). Payment by C.O.D., check, MasterCard, or Visa. Credit card customers include complete card number and expiration date. Add $2.00 for shipping, 3.50 to Canada; except monitors (call for shipping charges before ordering monitors). New York state residents add 7% sales tax. **Dealer Inquiries Invited**